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JPRS Report

Nuclear Developments

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China Urges World Nuclear Cooperation
*OW1901131789 Beijing Domestic Service in Mandarin
1030 GMT 19 Jan 89*

[From the "National Hookup" program]

[Text] In response to reporters' questions, Li Zhaoxing, spokesman for the Ministry of Foreign Affairs, said this afternoon that China is willing to have extensive cooperation with all countries in the world on the peaceful use of nuclear energy. He said, "China does not support nuclear proliferation, nor will it help other countries develop nuclear weapons."

Li Zhaoxing added, "The cooperation between China and Pakistan in the sphere of nuclear energy serves entirely for peaceful purposes. The relevant agreements signed between the two countries consist of specific provisions guaranteeing safety [AN QUAN BAO ZHANG]. The allegations that China has been assisting Pakistan in the field of nuclear weapons—allegations that newspapers and journals of India and other countries have time and again made—are completely groundless and have ulterior motives."

Asked by a reporter to comment on the talks between the vice foreign ministers of China and Vietnam, Li Zhaoxing replied, "This is an internal consultation [NEI BU CUO SHANG], focusing primarily on how to settle the Cambodian issue politically."

When asked what is China's view on Soviet leader Gorbachev's recent announcement that the Soviet Union will unilaterally withdraw 200,000 troops from

Eastern Europe, Li Zhaoxing said, "We welcome the Soviet announcement to withdraw part of the Soviet troops stationed in foreign countries. We hope such withdrawals will continue."

China Claims Nuclear Ties to Pakistan 'Peaceful'
*OW1901103989 Beijing XINHUA in English
0901 GMT 19 Jan 89*

[Text] Beijing, January 19 (XINHUA)—Cooperation between China and Pakistan in the field of nuclear energy is solely for peaceful purposes, Chinese Foreign Ministry spokesman Li Zhaoxing said here today.

He also said the relevant agreements between the two countries contain clauses on safety in explicit terms.

Li made these remarks at the weekly news briefing when asked to comment on an Indian newspaper report that China had assisted Pakistan in producing nuclear weapons.

Li said, "China is ready to conduct extensive cooperation with other countries across the world in the field of peaceful uses of nuclear energy."

"China does not stand for nuclear proliferation and does not help other countries develop nuclear weapons," he stressed.

"Some newspapers and periodicals in India and certain other countries have time and again spread the allegation that China has assisted Pakistan in the 'field of nuclear weapons.' This is utterly groundless and out of ulterior motives," he pointed out.

INTER-AMERICAN

Argentina, Brazil 'Could' Build Bomb in 2 Years
51002040a Rio de Janeiro O GLOBO in Portuguese
7 Dec 88 p 14

[Article by Paulo Motta]

[Text] The first atom bomb in a Latin American country could be built by Brazil or Argentina within 2 years if a political and economic decision to do so were made today. That assessment comes not from antinuclear militants but from experts in the Federation of American Scientists (FAS) who are participating in a seminar on nuclear safety at the Coordination Board of Postgraduate Programs in Engineering (COPPE) of the UFRJ [Federal University of Rio de Janeiro]. The only difference is that owing to the special features of each country's uranium enrichment project, Brazil could take that initiative in secret, whereas implementation of the plan in Argentina would be detected by satellites or aerial photographs.

As explained by David Albright, coordinator of the FAS team of scientists, and William Higinbotham, one of the FAS founders (he also participated in the first U.S. atom bomb project in Los Alamos), Argentina uses the gaseous diffusion process for enriching uranium. The only problem is that in order to enrich uranium to 90 percent in sufficient quantity—the amount needed for the bomb—it would have to build large and easily detected facilities. But the process used by Brazil in Aramar (Sao Paulo)—ultracentrifugation—can be strategically altered in a number of ways to produce fuel for the bomb without the need for major construction projects.

"Brazil's uranium enrichment program is more flexible than Argentina's. If the centrifuges in Aramar are grouped in series instead of in parallel to produce up to 5-percent uranium (to fuel power plant reactors), they can also enrich uranium up to 90 percent much more quickly. Little modification or additional space is needed, and Brazil could therefore conceal its intentions," said David Albright, who emphasized that he was speaking theoretically.

According to information reported at the seminar yesterday, the rector of Sao Paulo University, Jose Goldemberg, announced that about 300 centrifuges were already operating in Aramar and that the Brazilian Government's intention was to increase that number to 3,000. It is not possible to build an atom bomb with the 300 now in existence, according to William Higinbotham. But with 1,000 centrifuges, it would be possible in 1 year to obtain the amount of enriched uranium needed for producing the device. The only thing lacking would be a team capable of designing it.

"The fact that a country can enrich uranium is not blameworthy. We are not here to teach or judge. But it is necessary to have monitoring systems, and we are concerned because they do not exist, and we can make a few suggestions on how to set them up. Brazil and Argentina already have the capability for building the atom bomb and are even classified as "emerging nations" in terms of nuclear weapons by the Carnegie Foundation for International Peace. The current governments do not want to build such a bomb, but future governments might. Another danger is that two projects may be developed simultaneously—one for designing the bomb and the other for enriching uranium—with neither team's awareness of the other. Then one fine day the country will know how to assemble the bomb and will have the material for doing so," said Higinbotham.

In fact, the two American physicists came to Brazil precisely to exchange information and support the proposal, submitted by the Brazilian Society of Physicists to the speaker of the Chamber of Deputies, Ulysses Guimaraes, that the Aramar project be monitored by Congress with the help of the scientific community. That proposal concerning "internal safeguards" would protect the industrial secrecy so strongly advocated by the National Nuclear Energy Commission and place the nuclear program under civilian control.

Organization Studies Nuclear Threat

Founded in 1945 by scientists who had worked on the Manhattan Project—which resulted in the first atom bomb explosion at the Los Alamos Proving Ground in the United States—the Federation of American Scientists is an organization devoted to studying the problems, dangers, and implications of the so-called nuclear era. Its members include 47 Nobel Prize winners. A nonprofit organization that has no ties with any government agency, it manages the FAS Fund for research and education. In addition to studies of nuclear proliferation, its members are also active in the areas of nuclear waste and the safety of nuclear installations.

Besides being backed by its widespread reputation, the institution's observations concerning the Brazilian nuclear program are especially important at this juncture, considering that as a consequence of the recent reformulation of the program—which resulted in unification of the so-called official and parallel programs—the nuclear power plants were placed under the control of Furnas Electric Power Plants, Inc. That merger of the electricity and nuclear sectors is reportedly having repercussions at the World Bank, meaning that the bank's loans to the Brazilian electric industry might now be contingent on the adoption of safeguards or at least compliance with safety standards in the nuclear power plants.

BRAZIL

Policy Council Studies New Program Measures

Program Changes Confirmed

51002040b *Sao Paulo O ESTADO DE SAO PAULO* in Portuguese 10 Dec 88 p 26

[Text] Rio de Janeiro—The chairman of the National Nuclear Energy Commission (CNEN), Rex Nazare, confirmed yesterday that the first measures in connection with the new Brazilian nuclear program would be officially announced by the start of the year. Studies concerning the economic, social, and political viability of the new measures are currently nearing completion. The main new features may be construction of the Angra III nuclear power plant and utilization of the ultracentrifugation technology developed under the parallel program in Ipero, Sao Paulo.

The data on which the new program will be based are being studied by the Higher Council on Nuclear Policy, which consists of 19 ministers of state, authorities in the nuclear sector, and three representatives of the national scientific community. "As far as the economic aspects are concerned, the costs of each activity and the existing technological alternatives are being reviewed, the objective being to come up with figures that will not increase the internal and external public deficit," said Nazare.

For example, technicians are studying the feasibility of the domestic production of uranium hexafluoride gas (used to enrich uranium and turn it into fuel for nuclear power plants). "Brazil has mastered the technology for producing that gas, but currently obtains it from France," said Nazare. According to him, production of the gas will not be economically viable until demand reaches 500 metric tons per year. Consumption currently totals only 116 metric tons.

Nazare said that technicians were investigating the costs necessary for completing Angra III—a nuclear power plant on which construction has already started and which represents "a sizable demand for equipment and services." They feel that Angra III is essential for preserving Brazilian nuclear technology. "Moreover, if it is found in the future that nuclear energy is absolutely essential, we will have the capability for meeting the demand," he added.

IBRD Loan

While studies of the new nuclear program are in the process of completion, the Brazilian Government and the World Bank (the IBRD) have agreed to call a truce in talks concerning the \$500-million loan which that institution was to have made to Eletrobras [Brazilian Electric Power Companies, Inc.] but which was suspended because of Brazil's decision to include construction of the Angra III nuclear power plant in that government-owned enterprise's electricity program. According to a source at the IBRD, the best thing now is to stall for time

so that both parties can think about an alternative that will resolve the impasse. "The way things are now, the loan agreement is not going to be signed. So it is necessary to reflect calmly and find a solution," said the source at the bank.

In the opinion of that IBRD official, the bank is not worried about the Brazilian Government's intention to carry out a new nuclear program that would include construction of Angra III. But the basic reason for the loan, for which negotiations have been underway for 2 years, was the financial recovery of the electricity sector. Since the suspicion exists that Angra III is not an economically viable project, granting the funds would violate the principle that has guided all previous negotiations.

Commenting yesterday on the IBRD's decision to suspend the loan to Eletrobras, the director of the National Department of Water and Electrical Power, Getulio Lamartine, predicted that electricity rationing would be adopted throughout the country if alternatives were not found for meeting the industry's investment requirements.

Paper Comments

51002040b *Sao Paulo O ESTADO DE SAO PAULO* in Portuguese 11 Dec 88 p 3

[Editorial: "The New Nuclear Program"]

[Text] After he recovers from the distress and pain caused by the earthquake in Armenia, President Gorbachev will have time to reflect on whether, in contriving to transform the international diplomatic scene, he should or should not have included Brazil on the list of big powers. More than anything else, a big power is defined by the responsibility with which its governments assume commitments on the international scene—or, inversely, by their strategic ability to ignore their commitments. It happens that President Jose Sarney, who together with the president of the USSR signed the "Declaration on the Principles of Interaction on Behalf of International Cooperation," is the same person who is authorizing authorities in the energy sector—and military authorities—to expand a nuclear program that is completely exempt from the International Atomic Energy Agency's safeguards and inspections. In the above-mentioned document signed in Moscow, the Brazilian chief of state expressly recognized "the imperative need to prevent the geographic dissemination of nuclear weapons." As a head of government who does not want nuclear proliferation and who has put Eletrobras in charge of running the nuclear power plants, Jose Sarney is admitting the possibility that an atom bomb will be produced, even though an actual plan for doing so does not exist.

The fact of the matter is that in Moscow, it was indicated that Brazil might adhere to the Nuclear Nonproliferation Treaty—because how can anyone refusing to sign that document be committed to opposing the dissemination of nuclear weapons? In Brasilia, there is adherence to the

nationalist urge of the military class, which under Geisel forced the signing of the nuclear agreement with the FRG, not so much in order to resolve the Brazilian energy crisis as to be in a position, once in possession of the technology involved in the nuclear cycle, to produce or not produce "nuclear devices" for peaceful purposes as authorized by the Treaty of Tlatelolco.

Military pressure to expedite mastery of the technological steps enabling Brazil to reach the industrial stage in the manufacture of those "devices" (if there is a political decision to do so) is obvious in the news item we published on Friday: "On the fifth floor of Planalto Palace, where the Military Household of the Presidency has its offices, meetings to determine the form of the new nuclear program are lasting into the early morning hours. President Jose Sarney and the ministers—General Baima Denys, chief of the Military Household, and Ivan de Souza Mendes of the SNI [National Intelligence Service]—are not disposed to yield to the demands of the World Bank." It can be seen from those words that it is the military who are determining our international economic policy and also our foreign policy. And they are determining both policies, which are really only one, in the touchiest areas—that is, those concerned with nuclear proliferation, manufacture of the bomb, and foreign debt. It would be interesting to know whether the computers of the former National Security Council and the SNI are programmed to assess the reaction by Argentina's military to Brazil's ardent desire to expedite the parallel nuclear program.

Before getting onto that subject, it is advisable once again to explain in detail the pretext being used by the Military Household and the SNI to create a major difficulty with the World Bank (IBRD). At the heart of the issue is a \$500-million loan from the IBRD to Eletrobras to cover construction projects that are necessary if Brazil's energy supply is not to be jeopardized. That agreement had been negotiated, and the agreement was that Brazil's private creditor banks would disburse substantial amounts as soon as the World Bank released those funds. With the negotiations at an advanced stage, a decree-law by President Sarney transferred construction and operation of the Angra I and Angra III nuclear power plants to Eletrobras. The IBRD's rule is that it does not lend money for undertakings that might endanger the environment, much less nuclear power plants. Despite that torpedo fired at the waterline of the agreement, bank authorities agreed to accept Angra I, since it was already completed, and to permit part of the financing to be used for Angra II, which was 60-percent complete. As for Angra III was concerned, they simply asked for a study to determine its technical and economic feasibility.

That request for a study was all it took to trigger the latest wave of nationalism: The military are insisting that national sovereignty is in danger because the IBRD, which is controlled by the Americans, wants Brazil to explain why it wants to build a nuclear power plant that will produce more expensive electricity than any hydroelectric plant built during the same period. It was that irate accusation of interference by the IBRD with Brazilian sovereignty which brought to light the fact that the plan that had inspired the major deal with firms in the FRG would now, for reasons of national sovereignty, have to be concluded with Brazilian firms.

The difference between the program being developed by the Navy in Ipero and the one that the SNI intends to establish is one of scale. That says it all. To reach the stage of enriching uranium by the ultracentrifugation method, the Navy, according to the best information we have, sacrificed part of its reequipment budget so as not to burden the Federal budget in any way. Moreover, unless the centrifuges were to occupy a huge area, the scale of that process was such that the percentage of enrichment could not exceed the planned level, the purpose in the Navy's case being to obtain fuel for a submarine reactor. But, if the scale of the project is simply changed and the ultracentrifugation method is retained—all of it beyond the control of the IAEA—no one will know when the Council and the SNI, united in their repudiation of the World Bank, reach the point of being able to store fuel with which to manufacture the first "device". That ardent desire to have the necessary technology for military use may be enough in itself to explain why three responsible men have decided to throw away \$500 million from the IBRD, another \$1 billion or so from private banks, and other hundreds of millions from the famous Japanese fund, the release of which was linked to the signing of the agreement with the World Bank.

The arguments in favor of building Angra III—raw material, technology, and the cost of petroleum—are half-truths and therefore fallacious. We will come back to them. The important thing to be made clear now is that the Sarney administration is firmly prepared to complicate Brazil's relations with the international financial community in order to develop an autonomous nuclear program on a scale larger than that of the Navy program. Was that what Sarney and Gorbachev agreed to, or has the Soviet leader lost sight of the fact that one of the basic objectives of Soviet policy is to prevent big powers such as Brazil from producing nuclear devices for peaceful purposes as allowed by the Treaty of Tlatelolco?

The nation has the right to be correctly informed as to what the government intends to do with this new nuclear program, which has no safeguards. If for no other reason, because the ground is trembling in Angra dos Reis.

INDIA

Norway Silent on Heavy-Water Story

51500048 Bombay *THE TIMES OF INDIA* in English
30 Nov 88 p 1

[Text] Bombay, 29 November—The government of India has not yet received any request from Norway to probe the alleged disappearance of heavy water at Bombay airport.

Reacting to reports in a section of the press government sources said if the Norwegian government furnished the documents and particulars, the matter would be investigated. There was no question of allowing the Norwegian police to investigate in India, it was stated.

The department of atomic energy has denied persistent reports that the heavy water ended up in India clandestinely.

According to reports from Oslo in December 1983, 21.7 tonnes of heavy water was clandestinely diverted by a West German businessman after a mysterious change of flights. The heavy water, instead of reaching Frankfurt, was transhipped from Basel in Switzerland to Dubai and then to Bombay on board a West African airline.

The allegation that India got heavy water through illegal means, and that too a meagre 21 tonnes, was illogical, the sources said. India had got some heavy water from Canada for its Rajasthan Atomic Power Station (RAPS) and later, Russia supplied the heavy water.

For a 235 MW unit, about 250 tonnes of heavy water is required for the start in process. The power plant runs on the same fuel and only the negligible amount lost in leakage is replaced periodically. The loss in Rajasthan units are said to be ranging from three to five tonnes per year.

Already India has established sufficient capacity for heavy water production. If the Soviet Union is excluded, India stood as the second largest heavy water producer in the world. Its current installed capacity is 313 tonnes. Norway's production is just two tonnes, while Canada produced 3,050 tonnes. As early as in 1985 India was producing 255 tonnes of heavy water and the Madras Atomic Power Station is entirely run Indian heavy water. The Rajasthan units using the Soviet heavy water is under international safeguard and no Indian heavy water is used there.

In fact, indigenous production has reached such a level that imports from the Soviet Union has dwindled to less than 15 tonnes per annum. The Soviet Union is said to have asked India to make a long-term commitment projecting its import of heavy water till 2000.

But India had indicated its desire to import the minimum quantities that would be required for the next four years. It is advisable to use the Soviet heavy water at RAPS since Indian heavy water could be used elsewhere.

Thus, only to meet this limited need of RAPS, India would import heavy water from the Soviet Union.

The story that the heavy water ended up in India had many loopholes. The department of atomic energy never allowed its imports to be handled through any private agency. The directorate of purchase and stores directly handled all imports of the DAE.

The story also lacks credibility because there are not many users of heavy water in the world for power generation. Pakistan has one 125 MW unit using heavy water but Pakistan would not venture to get its import through India, the sources said. Another prospective user of heavy water, for weapon purposes, is Israel. But no one has been able to penetrate the Israeli secrecy.

According to one section, this story could be an attempt to malign Indian government's nuclear policy and it could be in retaliation to the stories which indicted Pakistan of acquiring nuclear weapon capability clandestinely.

Another puzzling factor coming from Oslo is that Russian trucks delivered some heavy water at Basel and the Russian drums were re-painted. India could have got the consignment from the Soviet Union directly and there was no need to erase the Russian markings on the drum. The sources said there were too many loopholes in the story and the quantity of heavy water mentioned too little to warrant any attention.

'No Evidence' of Pakistan Nuclear Test in PRC

BK1301125089 Delhi Domestic Service in English
1230 GMT 13 Jan 89

[Text] The government has said that there is no evidence to substantiate press reports that a nuclear test by Pakistan was taking place in China at the time mentioned in the reports. An official spokesman said in New Delhi today that the government had seen the press reports quoting Western intelligence sources that China is arranging a nuclear test for Pakistan at its (Lop Nor) testing ground. Responding to queries by newsmen, the spokesman said India is aware that China is providing material in the nuclear field to Pakistan.

Fears About Koodangulam Nuclear Power Plant Allayed

51500049 Madras *THE HINDU* in English
27 Nov 88 p 3

[Text] Madras, 26 November—The Governor, Dr P.C. Alexander, today asserted that nuclear power was an accepted source of energy in the industrialised advanced countries of the West, and the proposed nuclear power plant at Koodangulam would have a major impact on the industrial development and economy of Tamil Nadu.

Addressing a press conference, with a team of experts from the department of Atomic Energy by his side, the Governor allayed apprehensions over the safety of the people in the area as also of the marine and plant life.

Dr Alexander said that there was a lot of misconception and misunderstanding about nuclear plants. The general statement that the industrially advanced countries of the world were moving out of or going slow on nuclear energy was ill-founded, he said and in support of his point, cited the example of France where 69.8 per cent of the total energy came from nuclear plants. The percentage was 31.3 in the Federal Republic of Germany, 29.1 in Japan, 53.3 in Korea and 45.3 in Sweden, which was known for its safety consciousness. Compared with this, nuclear energy in India was only 2.6 per cent and even when all the on-going projects were completed, by 2000 A.D., nuclear energy would be infinitesimal, he added.

The Governor said that he was aware of the powerful anti-nuclear lobby in the world and would not treat it with any disrespect for its view that nuclear energy was harmful in general; but, very often, by the time it came to countries such as India, it was somewhat ill-informed and thus people could be misled.

On the question of safety of the Koodangulam project, the Governor pointed out that in the excluded zone (1.6 km radius) nobody was living. Beyond that, in the 'sterilised zone' lying in a radius of 5 km, only 15,000 people were living who would be taken care of. Within a radius of 10 km of the plant, only 40 per cent was land and the rest sea. There would not be any largescale displacement of people as the land acquisition was likely to be minimal—about 700 hectares for the plant purposes and 400 acres for the housing colony in an area where there was very little agricultural activity.

Dr Alexander said that he had been assured by experts that all precautions were being taken in the design of the plant so that the temperature of the coolant water discharged into the sea would be maintained at a level that would not be harmful to the marine life or affect fishing. He assured that the interest of fishermen in the three villages in the area would be fully taken care of by the State Government 'I give the guarantee that fishermen will be utmost in the scheme of assistance to the people of that area.'

The Governor said that the project was expected to come to fruition by 1998, but even during the construction stage there would be a minimum direct employment of 6,000 people in that area. About 1,500 foreign experts would be living there and catering to their daily needs should generate a lot of economic activity in not only Tirunelveli district but also in the neighbouring districts of Madurai and Kanyakumari.

Different from Chernobyl type: The Managing Director of the Nuclear Power Corporation, Mr S.L. Kati, said that the proposed plant was totally different from the Chernobyl type; it was of the very advanced design with safety features and did not have the undesirable characteristics of the Chernobyl reactors. 'This is of good design, as safe as any other reactor elsewhere in the world.' A team of Indian experts would be trained in the Soviet Union for operating the plant, he added.

The Governor said that it might not be possible to include the foundation stone laying ceremony for the project in the Prime Minister's programme for his current visit. There would be a special function for the purpose some time later with Russian experts also participating in it.

Columnist Sees Need for Atomic Bomb

51004702 New Delhi NAVBHARAT TIMES in Hindi
26 Nov 88 p 4

[Article by Subhash Sharma: "Atom Bomb Essential for Peace"]

[Excerpts] The first reactor unit with the capacity of 235 mega-watts at Narora is soon going to be commissioned. This will be our seventh reactor unit. The six previous units, already in production, have a total capacity of 1,230 mega-watts. In the entire production of electricity in the country, the contribution of these reactors is negligible. In spite of this, whenever we start talking about a nuclear reactor some kind of controversy always arises. Although this reactor of ours is exclusively for peaceful purposes a pressure is being put on us not to commission it. Why is this?

The fact is that nuclear reactors have never been a symbol of peace. This is because besides producing electricity they also produce fuel which can be used for manufacturing nuclear weapons. As a symbol of power these reactors in India are at least considered to represent an image of Dr Bhabha. This is probably because of the incident in 1962 when our country was mauled by a Chinese invasion and occupation of a big chunk of our land by them. [passage omitted]

As a matter of fact, the years of 1962, 1964, and 1966 proved to be inauspicious for us. The defeat suffered from China in 1962, the nuclear explosion by China in 1964, and the death of Dr Bhabha in a plane crash in 1966, all dampened our spirit in the pursuit of a nuclear program. On one hand China, after defeating us and exploding a nuclear bomb, was on the verge of becoming a world power, on the other, we became helpless even in the peaceful use of nuclear energy. The result is clear today. While remaining behind us in the production of nuclear energy China has become one of the world powers. In world organizations it gets respect as a super power while we are treated as an ordinary nation. Nobody can say how long the political blunder committed at the earlier time will continue to torment us.

During the sixties, when India ultimately took a determined decision to use nuclear energy for peaceful purposes, the matter of construction of nuclear reactors for the production of electricity came up. First of all, the matter proceeded for constructing a nuclear reactor with foreign assistance and subsequently one was established at Tarapur. In this power plant with two reactors the plan was to use enriched uranium. The fuel was to be purchased from the United States. The power plant,

constructed with assistance from Canada, started producing electricity in 1969.

It was Dr Bhabha's idea to buy enriched uranium from the United States and use the natural uranium for self-constructed reactors. In natural uranium there is 99.3 percent uranium-238 and 0.7 percent uranium-235. Only uranium-235 is used as reactor fuel. In order to enrich the uranium the percent amount of uranium-235 is increased from 0.7 to 2.7. Uranium-238 has to be separated from it. We are not in a position to do this because we have an estimated deposit of only 60,000 tons of uranium. This is not enough. It was, therefore, proper to decide to buy enriched uranium from the United States rather than to enrich our own uranium. On the other hand, after using natural uranium in our self-constructed reactors, we can use its fuel in the fast breeder reactors. We need thorium for this purpose of which we have a large deposit.

When on 18 May 1974 India exploded a nuclear device at Pokharan, the Western nations reacted as if they had received the greatest threat from India going nuclear. Apparently, according to the scheme of these nations India should depend on the nuclear super powers in the event of an impending danger of a nuclear attack rather than equip itself. It became clear from this that these nations intended to ruin the political importance of India for the future. Later on, India actually got entrapped in their scheme when it decided not to make nuclear weapons in spite of being successful in exploding a nuclear device. It is unknown how and why this decision was taken. Even after the explosion we were not prepared to accept that it was an explosion. One time we described it as a peaceful explosion, on the other, as something else. As a whole we were rather repentant about the explosion. While there was a jubilation all across the country over the explosion on the political level it was never considered to be a symbol of power or self-confidence. We also became an object of ridicule in the world because of the statements given by our scientists. It was repeatedly said that the nuclear explosions would help us in finding water resources or mineral deposits. Interestingly, by that time at least a thousand explosions had been conducted and nobody had ever made such a claim.

Actually a decade later, we had an opportunity to rectify the mistake committed in 1964, but we even lost that. Not only that, subsequent to the explosion Pakistan got a good opportunity to slander us. It got out of signing the nuclear non-proliferation treaty by saying that it would not sign it unless India signed it. On the other hand, Pakistan also accelerated its nuclear program as a result of which it is now on the verge of making a nuclear weapon. Of course, following this, the roles of India and Pakistan have changed. Earlier, Pakistan used to blame India for trying to make a nuclear bomb now it is India that is blaming Pakistan for this.

While Pakistan initiated its nuclear program at a late stage, it is necessary to know what progress has been

made by China during this period. For the Hydrogen Bomb, that China tested in 1966, it needed a time of only 2 years and 8 months, while for the same testing the USSR had needed 4 years and the United States had needed 7 years and 4 months. China tested missiles of the range of 1,000-1,100 kilometers in October 1966 and those of the range of 13,000 kilometers in 1980. Also its stockpile of nuclear weapons is third in the world. Roughly, China, whose nuclear program three decades ago was behind that of ours, is now at least two decades ahead of us.

What have we gained today by negating the use of a nuclear weapon in a war? Today, we get concerned by the news of Iran's deployment of Chinese Silkworm missiles and Saudi Arabia getting Eastwind-3 missiles. We also become disturbed by the setting up of missiles in Tibet by China. Again, if Pakistan also manufactures an atom bomb its F-14 fighter planes will look for targets in India only.

Actually everything will depend upon our political relationships with Pakistan, China, and the Soviet Union. And India, without nuclear weapons, will have to tow the line of a nuclear super power in order to save itself from a blackmail by nuclear-powered Pakistan or China. Even otherwise, if we decide today to manufacture nuclear weapons our nuclear power will be at par only with that of Pakistan or the 35 other nations which have a capability of producing nuclear weapons.

University Grants Commission Schemes for Nuclear Research

51500050 Calcutta THE STATESMAN in English
26 Nov 88 p 14

[Text] New Delhi, 25 November—The Nuclear Science Centre here will soon start developing the Heavy Ion Reaction Analyser and the Gamma Detector Array to study nuclear matter. The centre was set up in 1985 by the University Grants Commission as a modern institution with the university system for accelerator-based research.

Its primary objective is to provide frontline facilities for research in atomic physics, nuclear physics, condensed matter physics, nuclear chemistry, bio-sciences and several other disciplines.

The infrastructure and the equipment are being created at the autonomous inter-university centre to implement a number of advanced research programmes. The main facility in the first phase is a 15 million volt tandem accelerator, known as 15 UD Pelletron fabricated by the National Electrostatics Corporation of Middleton in Wisconsin. It is capable of accelerating almost any ion across the periodic table from proton to uranium to energies up to 200 MEV. There is a committed plan to augment the accelerator system to higher energies in the second phase.

The Pelletron accelerator tank is 5.5 meters in diameter and 26.5 meters in height. A 30-meter-tall tower around

the tank was constructed by using the slip-forming technique in just five weeks time. A ion-source room is being built on top of the tower for the generation of heavy ions to be accelerated by the Pelletron. Support facilities will be completed by March next year when installation of the Pelletron will start. Ion beams from the Pelletron are expected to be available by the end of 1990.

The two major projects will facilitate the study of extreme states of nuclear matter—exotic nuclei and nuclei with very high spin. These projects involve development of two major equipment—the heavy ion reaction analyser will analyse exotic nuclei by a combination of electrostatic and magnetic deflection using sophisticated detectors. The detectors will be developed at the centre and at several universities.

The Gamma Detector Array project has a two-component Gamma detector system to measure as completely as possible the gamma rays emitted from these nuclei.

The UGC has agreed to provide the funds for these two special research projects during the Seventh and Eighth Plan period.

PAKISTAN

Professor Calls for 'Nuclear Refuge' for Islamic World
51004703 Islamabad *THE MUSLIM* in English
26 Nov 88 p 6

[Article by Abbas Rashid: "Islam, the Bomb and the Third World"]

[Text] Lahore, Nov 25—"We need a nuclear refuge," declared Prof Ali A. Mazrui here today as in the course of his lecture he spoke in approving terms of Pakistan's nuclear programme and argued against the efforts to declare Africa a nuclear free zone. He advocated horizontal nuclear proliferation particularly in the Third World as a means of strengthening pressures for the renunciation of nuclear weapons by everyone, precisely because the great powers do not trust Third World countries with such weapons.

He said this kind of proliferation "could create enough consternation in the northern hemisphere to result in a massive international movement to declare nuclear weapons illegitimate for all, and to put an end to nuclear arsenals in every country that has them."

He likened this process to "vaccination" i.e. "a dose of the disease becomes part of the cure."

In his view this cure would be most effective in the Middle East "the heartland of the Muslim world." Not only, he argued, [is] the danger of global war the greatest in this region (and hence the alarm this would create) but also it would represent a marriage between two forces

that the West today is most nervous about i.e. nuclear proliferation and Islam.

Like Africa, he said, Islam had been marginalised in this era and in desperation may be forced to seek its own nuclearisation. To this effect he proposed bringing together "the financial resources of one part of the Muslim World with the scientific resources of another."

In terms of the latter, he said, Egypt and Pakistan were in the vanguard and as for the former Saudi Arabia and the Gulf state led the rest.

Departing from his written text he warned that the United States would seek to exercise a veto over the nuclearisation of Pakistan through financial as well as other means now that the Soviet forces were in the process of withdrawing from Afghanistan.

He also suggested that increasing collaboration between the super-powers might eventually work to the disadvantage of Third World countries like Pakistan. For a marginalised Africa he held up the rather happy prospect of black African eventually inheriting the nuclear infrastructure of white racist South Africa who, he said, could as a result be "elevated from the status of being the most humiliated blacks of the 20th century to being the most powerful blacks of the 21st century.

Prof Mazrui went on to speculate on the nature of the relationship between nuclearisation and feminisation in Third World countries citing the examples of India, Israel, China and Argentina to suggest that politically powerful women had disproportionately impelled their societies towards nuclearisation. He advocated greater participation by women in matters of war and peace as a relatively more sure route to global disarmament.

While many of the points raised by Prof Mazrui in his lecture were indeed thought provoking there was much in it that was loosely argued and one sided. He did not for instance spend any time at all on the effects of nuclearisation or the grave imbalance that already exists between state and civil society in most Third World countries particularly in the Muslim World. Nor did he address the difficulties, formidable to say the least, in the way of Muslim societies acting in unison. Similarly he chose to bypass completely the internal contradictions with which most such societies were beset, as for instance seeking to go nuclear without having acquired even a minimum in terms of an infrastructure for scientific research or a technological base of any significance not to mention the basic necessity of life and dignity for their people.

Earlier, Altaf Gauhar, Secretary-General of the Third World Foundation introduced the speaker and afterward Begum Manzur Qadir addressed the audience briefly. Dr Rafiq, Vice-Chancellor of Punjab University presided. The lecture titled "the nuclear option in the Third World: African and Islamic perspectives" by Prof Ali A. Mazrui, had been arranged jointly by the Third World Foundation and the Manzur Qadir Memorial Society.

Facing the Challenge of Nuclear Option
46000061z Islamabad THE MUSLIM in English
18 Dec 88 p 4

[Article by Ikram Ullah]

[Text] Kabuta had surprisingly and unwittingly become a major election issue. It sparked off a campaign duel between the IJI and the PPP. The innocent voter totally ignorant about the factual position was pushed to a point by some publicity agencies that the security of the state of Pakistan was in danger. The Co-chairperson of the People's Party offered a public debate to remove the clouds. The dust settled down without such a debate as wiser counsels prevailed not to make a sensitive issue like Pakistan's nuclear study an instrument for vote catching. It is not an exclusive domestic issue. It has regional and global implications far more complex than the Afghanistan policy or our relationship with India.

Nuclear Club

Pakistan's pursuit for nuclear energy for peaceful purposes has plagued our relationship with the nuclear club countries over the past two decades. They are all determined that, Pakistan, at all costs, must be prevented from acquiring this technology. To date, the USA has been acting, for whatever reasons, as the leader and spokesman of this club. It has been chosen to perform this role for obvious reasons. It is the only country which has the ability to turn off the economic and military aid that has sustained Pakistan since our birth in 1947. Self-reliance is a mere slogan and as much a far cry as ever before. Without economic independence, political freedom is stripped of much of its true meaning. With the dawn of a new era in Pakistan, as we stand on the threshold of much coveted democracy, our financial bankruptcy speaks volumes. This is the yardstick by which the performance of the outgoing regime can be judged and measured. Zia said in July 1977 that Bhutto had left him an empty kitty. Bhutto's daughter does not seem to have inherited anything better in 1988.

Zulfikar Ali Bhutto was beset with many problems when he took over the task of governing Pakistan in December 1971. Seventeen years later in December 1988, Mohamma Benazir Bhutto faces a worse scenario, both domestic as well as global. And she has a long way to catch up with her father's stature, political acumen and perception of the virulent power games which consume the Third World all the time. The nuclear option is one such lethal issue.

The idea of developing nuclear energy was the brain child of Zulfikar Ali Bhutto. In India it was Jawaharlal Nehru. In Israel, Prime Minister David Ben-Gurion conceived the idea in 1957. Both India and Israel have long since joined the club, without any protest. On the contrary the Western response has been not only encouraging but gleeful. France and the U.S. actively helped Israel in acquiring the technology. There is ample evidence to justify this assertion. The motive was to equip

Israel with a veto against the Arabs in general and Palestinians in particular. Denying a U.S. visa to Yasser Arafat to address the United Nations General Assembly in New York speaks louder than any other argument, on the subject of American love for Islam or freedom. Similarly, India's explosion of a nuclear device in 1974 was joyfully received by the West as a counter-balancing feat against China in Asia. It did not stop there. In September, 1979, there was a 'mystery flash' somewhere in the South Atlantic or Indian Ocean area. Initial announcements attributed the flash to a South African device. Later in February 1980, the CBS network of the United States attributed the explosion to Israel. In other words, at first the inference was that the blast was a South African bomb, probably aided by Israel. But the CBS report, five months later converted it into an Israeli bomb, probably aided by South Africa. Since then, there have been many alternative theories to wash out and eliminate the dust that was raised over this "mystery flash." Those governments that are eager to minimise the chances of a nuclear arms race either in Africa, in the Middle East or South Asia, would in any case have been inevitably tempted to opt for a scenario which would not portray either South Africa or Israel as nuclear powers. This attitude of the club is certainly bad news for Pakistan, for the World of Islam and also for the African people, particularly the blacks in South Africa struggling for self-determination, freedom and democracy.

The Prime Minister, Mohamma Benazir Bhutto, has inherited a paradoxical situation which in the current global backdrop is not easy to handle. The interests of Pakistan and those of the U.S. and its other allies like Israel not excluding India, clash violently over this issue. Zulfikar Ali Bhutto fought a gallant battle and risked his neck for what he believed to be a just cause. No one knows how much Pakistan has moved forward in this delicate area since 1979. For one thing the conflict in Afghanistan has been a blessing in disguise insofar as the softening of the U.S. attitude is concerned. But, once the Russians are out of Afghanistan, hopefully by February 1989, the Symington axe might again appear over the mushroom clouds of Kahuta.

One fact is quite evident. Except for their own trusted bedfellows, the great powers do not trust Third World countries with nuclear technology and least of all, any Muslim country like Pakistan. There is a theory that this distrust could become an asset if the threat of nuclearisation of the Third World creates enough consternation in the northern hemisphere to result in a massive international movement to declare nuclear weapons illegal for all, and to put an end to nuclear arsenals in every country that has them. According to Professor Ali A. Mazru of the University of Michigan, who was recently in Lahore, what this theory means is that although greater risk of nuclear war comes from vertical proliferation in the northern hemisphere and only secondarily from horizontal proliferation in the Third World, the vertical variety in itself has not been enough to end this

dangerous nuclear order. The "vaccination" of horizontal nuclear proliferation might be needed to cure the world of this nuclear malaise—a dose of the disease becomes part of the necessary cure.

Challenge

As far as Pakistan is concerned, its entire defence strategy has always been evolved in relation to the threat faced by it. Basically Pakistan's economy is ambivalent about militarism and rearmament. The rest of the Third World also shared this doctrine of non-alignment. So great was India's image in this respect that Uganda's Milton Obote described Nehru as "the founder of non-alignment." But how distantly related were the two doctrines of non-alignment and non-violence! Gandhi once said "Free India can have no enemy. For India to enter into the race for armaments is to court suicide. The world is looking for something new and unique from India. With the loss of India to non-violence, the last hope of the world will be gone." But in spite of Gandhi's vision, independent India did not practice abstinence. Gandhi's non-violence was not fully translated either into foreign policy or defence procurement. Nor indeed into the domain of nuclear technology.

India's non-violence and non-alignment was destined to go nuclear. India was indeed the first non-aligned country to explode a nuclear device. India was also the first country without a permanent seat in the Security Council of the United Nations, to go nuclear. The first five nuclear powers were precisely the warlords with the veto in the Security Council—the United States, the Soviet Union, Great Britain, France and the People's Republic of China. India at last had broken this neat equation and put the issue of nuclear proliferation on a new footing.

With Israel and South Africa having joined the club, the issue of nuclear non-alignment becomes a contradiction in itself. Pakistan finds itself in a difficult and dangerous position. After what happened to Baghdad, there has been talk of threats to Kahuta. It is strange and significant that when India tells the world that it will use its nuclear capability for peaceful purposes, everyone believes it. No one pays any heed to what Bangladesh, Sri Lanka and others, including Maldives have gone through. But strangely enough, when Pakistan assures the world, repeatedly, that it has no desire to put its nuclear technology to military use, everyone raises an eyebrow and threatens a veto.

The biggest challenge the Prime Minister of Pakistan faces today is the nuclear dilemma. Her father lost his life but did not give in on this issue. It is a political minefield through which she will have to tread with the utmost skill of diplomacy and statecraft.

Foreign Office Spokesman on Nuclear Policy
BK1601155289 Islamabad Domestic Service in Urdu
1500 GMT 16 Jan 89

[Excerpts] [A Foreign Office] spokesman denied that Pakistan has changed its position on nuclear energy or

that it has agreed to unilaterally open its nuclear installations for international inspection. He said Pakistan's stand is well known, that the issue should be resolved on a regional basis, and that Pakistan will agree to open its installations for inspection provided India also does so. Even if India, for any reason, is not prepared for international inspection of its nuclear installations at this stage, Pakistan will agree on an understanding on bilateral inspection. [sentence as heard]

The spokesman said Pakistan's nuclear program is purely for peaceful purposes and that it has always supported nuclear nonproliferation.

Position on Nuclear Energy Plans Reaffirmed

BK1701082989 Islamabad Domestic Service in English
1600 GMT 16 Jan 89

[Commentary by Mohammad Yamin]

[Text] Talking to a visiting American delegation led by Mr Stephan Solarz, a well-known congressman belonging to the Democratic Party, President Ghulam Ishaq Khan stated categorically that Pakistan's nuclear program was designed purely for peaceful purposes and that Pakistan had no intention of building or acquiring nuclear weapons. To dispel unwarranted criticism of the program, the president stressed that the world must believe what a democratic government says. Pakistan's position has all along been that the acquisition of nuclear energy is a dire necessity for it. For the last so many years it has been difficult for Pakistan to meet adequately its requirement of power even for domestic use, and load-shedding has been resorted to on a more or less regular basis. For its growing industrial and agricultural needs, the conventional sources of energy are grossly insufficient, and it should be appreciated that Pakistan can ill afford the resultant setback to its economy.

The president has underscored the vital importance of nuclear technology for Pakistan and has declared Pakistan's resolve to build its own nuclear power plants in time to come. On the nonproliferation of nuclear weapons, the president reaffirmed Pakistan's consistent support for it on a basis of nondiscrimination. Pakistan has always stood for nonproliferation but has resisted suggestions for its unilateral endorsement of the nonproliferation treaty. It has instead proposed that a regional approach to the problem should evolve. Pakistan has on several occasions made a number of viable recommendations to be adopted by all countries of the region.

Pakistan's principled stand has been that other countries that have nuclear programs should also agree to abide by the same regulatory restrictions that are desired to be imposed on Pakistan. Simultaneous signing of the non-proliferation treaty and inspection of nuclear facilities of the regional countries by international agencies are some of the offers made by Pakistan in this regard. Unfortunately, a bigger country of the region, which launched its nuclear program much earlier than Pakistan did, which successfully exploded its nuclear device 15 years ago,

and which had always declared that it is capable of manufacturing its own nuclear weapons in as short a period as 1 month, had always turned down these proposals, rendering the question almost intractable.

A majority of the world states are now in favor of this regional approach on nuclear weapons as propounded by Pakistan. It should be helpful if friendly states such as the United States impressed upon the desirability of its adoption by other states of the South Asian region also. Such a step, particularly by a major regional power,

would be in the nature of a confidence-building measure, which the smallest countries in the region so earnestly seek and whose usefulness, it may be recalled, was clearly emphasized in the recent SAARC summit conference.

Pakistan's position is clear. It has no desire to acquire weapons-grade nuclear capability, but, as a sovereign state, it would not accept discrimination in this regard. Also, it has every right to augment its energy resources and use nuclear technology for this purpose.

Minister on Suspension of Nuclear Power Projects
OW1101101989 Moscow International in Japanese
to Japan 1200 GMT 9 Jan 89

[From "Science and Technology" program]

[Text] The Soviet minister of nuclear power generation announced the suspension of six nuclear power station projects and construction plans. Does this mean a reexamination of nuclear power generation or the forgoing of the peaceful use of nuclear power in the national economy? Such questions are likely to emerge. Let us listen to what Nuclear Power Generation Minister Lukonin has to say on this issue:

[Begin recording] [Lukonin, speaking in Russian, fading into Japanese translation] An analysis of the short- and long-term balance of fuel energy in the Soviet Union shows that, without the development of nuclear power generation, the needs of the Soviet national economy cannot be met. Therefore, we must maintain the idea of continuing with nuclear power generation in areas where this is economically efficient and indispensable.

[Unidentified announcer] How then do you explain the suspension of six nuclear power generation projects?

[Lukonin] To us, the tragic experience of Chernobyl was not in vain. We have arrived at important conclusions. New measures embodying scientific, technical, and management methods have been decided upon to raise the operational safety level of existing and new nuclear power stations. Regulations on the location and conditions of nuclear power plants have been tightened. The construction of nuclear power stations in earthquake-prone areas and other problematic localities has been halted.

[Announcer] Specifically, where are these localities?

[Lukonin] The following plans and construction projects for nuclear power plants in the Soviet Union have been suspended: Azerbaijan and the second phase of the project in Armenia, Georgia, the Minsk nuclear power station, the Odessa nuclear power generation and local heating system, and the Krasnoyarsk nuclear power plant. The first three have to do with seismic conditions, and the latter three are due to the revision of regulations on the location of nuclear power plants and local nuclear heating systems.

[Announcer] How many nuclear power plants are there in the Soviet Union?

[Lukonin] At present, there are 16. The construction of nuclear reactors is in progress at 15 more sites.

[Announcer] What will be the effects on the economy of the suspension of six nuclear power projects previously included in the plans?

[Lukonin] There will be a loss of a total of 28 million kilowatts of electricity. It will take some time to look for new sites and draw up construction plans.

[Announcer] Please tell us your general view on nuclear power generation.

[Lukonin] Under normal conditions, the effects on the environment generated by nuclear power plants are even less than those caused by regular thermal power plants using organic fuel. Nuclear power plants do not exhaust carbon dioxide and neither do they need oxygen. Thus, we are in favor of safe nuclear power generation. Past experience in general and the events of the past few years show that wide-ranging international cooperation and the concerted efforts of all countries are necessary and indispensable for effectively ensuring the safety of nuclear power generation. [end recording]

Total Nuclear Test Ban Would Promote Nonproliferation

18160001d Moscow MIROVAYA EKONOMIKA / MEZHDUNARODNYYE OTNOSHENIYA in Russian
No 8, Aug 88 pp 26-38

[Article by Academician Vitaliy Iosifovich Goldanskiy, deputy director of the Chemical Physics Institute and chairman of the Soviet Pugwash Committee, and Valeriy Fedorovich Davydov, candidate of historical sciences and senior scientific associate of the USA and Canada Institute of the USSR Academy of Sciences: "Preventing the Horizontal Proliferation of Nuclear Weapons"]

[Text] A most alarming trend of the end of the 1980's is the increased danger of enlargement of the "nuclear club". At a time when the leading nuclear powers—the United States and the USSR—are coming to think of the need to neutralize the danger emanating from the confrontation of powerful nuclear arsenals and radically reduce them or get rid of them completely even, the nuclear arms race is threatening to erupt with new force.

At the present time more than 130 states subscribe to the 1968 Nuclear Nonproliferation Treaty. They include three nuclear powers—the United States, the USSR, and Britain—and also a large group of countries which have a developed nuclear industry and are capable of creating the corresponding weapons in a very short time; such "near-nuclear" (or "threshold") states have assumed, in accordance with the treaty, the political commitment not to embark on this path. Approximately 40 states remain outside of the treaty. These include two nuclear powers—France and the PRC—and also a group of "near-nuclear" countries—South Africa, Israel, Pakistan, India, Argentina, and Brazil. The first two are classified as "clandestine" nuclear states. Assessments of the potentials of the other above-mentioned countries differ merely as regards how many nuclear weapons they could create and when. All these countries are paying close attention not only to the stockpiling of fissionable material and, particularly, the appropriate technology but also to the acquisition of efficient nuclear weapon delivery systems. They are always aware of the possibility of conducting test explosions as a political method of openly announcing themselves as nuclear states.

The majority of specialists sees such a horizontal proliferation of nuclear weapons (meaning their appearance in nonnuclear states) as no less a threat to international security than vertical proliferation (the stockpiling of such weapons in the nuclear states). Some experts are concluding that if they are used, it will most likely be not between the United States and the USSR but between future nuclear states in a state of conflict with one another. All this is forcing onto the agenda of international politics the task of preventing such conflicts, forestalling nuclear terrorism and military acts pertaining to the destruction of nuclear facilities and adopting measures to limit the world trade in missile technology.

The nuclear powers, which have since the war created a cult of these weapons, have by their actions contributed to a considerable extent to the fact that the danger of horizontal proliferation has changed from a remote and abstract to a close and tangible danger.

The creation of huge potentials capable of annihilating the whole world many times over, a readiness to use them and their constant refinement—all this would seem proof of their indisputable military and political significance for safeguarding states' national interests. What, in this situation, could halt or appreciably slow horizontal proliferation? The technical barriers in the way thereof have already been overcome by the majority of "near-nuclear" countries, and the existing political barriers are insufficiently effective. The sole thing that remains is to begin to change the international environment, a most important component of which must be a total nuclear test ban.

I.

The cornerstone of the counteraction of the enlargement of the "nuclear club" remains the Nuclear Nonproliferation Treaty. Despite the constant growth in the number of subscribers, its fate is to a large extent uncertain. The treaty expires in 1995, and then the countries which have subscribed to it will have to decide whether to extend it or not. There is no certainty as to a positive solution of this question among the majority of specialists mainly because there are profound differences in the evaluations of its significance and efficacy between subscribers to the treaty: on the one hand the nuclear states, on the other, the majority of nonnuclear countries. These contradictions are connected primarily with the fulfillment of the mutual treaty commitments.

At the time this document was being drawn up, in the 1960's, there was a consensus in respect of the need to observe a balance of commitments between the nonnuclear and nuclear states subscribing to the treaty. If the first undertook not to produce and not to acquire nuclear weapons (article II), the second would in a spirit of "good will negotiate effective measures to halt the nuclear arms race in the near future" (article VI). In addition, the preamble signposted the fundamental path

toward this goal: it said that the nuclear powers proclaimed their intention to achieve "an end to all nuclear tests for all time".¹

Thus a direct relationship was established between horizontal and vertical proliferation. All the nuclear powers officially recognized this relationship. Speaking in 1968 in the United Nations, U.S. Representative A. Goldberg gave the assurance: "My country believes that the viability of this treaty will depend to a considerable extent on our successes in the future negotiations envisaged by article VI."² The nuclear powers—the United States, the USSR, and Britain—as depositaries of the treaty, also recognized that a complete nuclear test ban would be important testimony to their readiness to fulfill their commitments. President J. Carter emphasized: "A total nuclear test ban treaty would signal to the world the resolve of the countries which signed it to proclaim an end to the continued development of nuclear arms."³ However, the official recognition of the relationship of horizontal and vertical proliferation was not until most recently reflected in the nuclear depository powers' practical actions.

Twenty years after the signing of the treaty it is easy to conclude that, as distinct from the nonnuclear states, which have complied and continue to comply with their commitments, the nuclear subscriber-powers have essentially ignored their reciprocal commitments. From 1968 through 1988 their arsenals have grown several times over and now constitute 50,000 nuclear warheads. In this same time, following the conclusion of the 1963 Partial Nuclear Test Ban Treaty, the annual frequency of nuclear tests has increased sharply. The absence of a treaty on a total ban thereof made the Soviet-American negotiations a "labor of Sisyphus" in the sphere of the control and limitation of nuclear arms in the 1970's also.

It is not fortuitous that the nuclear powers' approach to disarmament has given rise and continues to give rise to invariable criticism on the part of the other states. At the three conferences (1975, 1980 and 1985) to monitor the effect of the Nonproliferation Treaty the nonnuclear countries invariably emphasized the importance of the conclusion of a total test ban treaty as a principal step leading to the strengthening of the global nonproliferation process. Consensus in respect of support for the nonproliferation process was reached with manifest difficulty at the first conference to monitor the effect of the treaty in 1975. The second conference (1980) ended in complete failure, despite the fact that at this time the United States, the USSR and Britain were close to signing a total test ban treaty. The conference was unable even to adopt a final declaration of support for the Nonproliferation Treaty. At the third conference (1985) an impasse situation took shape as a result of the fact that the overall increase in the arms race in the period 1980-85 had seriously disquieted the majority of subscribers to the Nonproliferation Treaty. Only the joint diplomatic efforts of the USSR and the United States enabled the conference to be saved from collapse.

On the question of a total suspension of nuclear testing the United States and Britain found themselves completely isolated not only from the nonaligned and neutral countries but also from the majority of their allies. In the absence of a readiness to follow the example of the USSR, which had in 1985 announced a moratorium on nuclear testing and called for the conclusion of a treaty on a halt thereto, the assurances of the United States and Britain that they supported deep cuts in nuclear arms as the way to comply with article VI commitments made no impression on the majority of conferees.

In spite of U.S. pressure, the group of nonaligned and neutral states prepared a separate declaration, which called on the "three Nuclear Nonproliferation Treaty depository states to impose as a temporary measure an immediate moratorium on all tests of nuclear weapons" and also "to negotiate a complete freeze on the testing, production and deployment of all types of nuclear weapons". It was inserted as a supplementary, but inalienable part of the final declaration. At the insistence of the majority of the conferees assessments (albeit toned down sufficiently to render them acceptable to the United States and Britain) corresponding to the actual state of affairs connected with article VI of the treaty were inserted therein. Section 12 of the declaration says: "The conference confirmed once again that the aims of article VI remain unfulfilled and concluded that the states possessing nuclear weapons must make greater efforts to ensure effective measures for an end to the nuclear arms race in the very near future and for nuclear disarmament.

"The conference, with the exception of certain states... expressed profound regret in connection with the fact that an all-embracing multilateral treaty on a halt to nuclear testing banning for all time all nuclear tests by all states in all media has yet to be concluded and called in this connection on the subscribers to the treaty possessing nuclear weapons to resume in 1985 the tripartite negotiations, and on all nuclear states, to participate in urgent negotiations concerning the conclusion of such a treaty as a question of paramount importance at the Conference on Disarmament."⁴

It is the question of banning all tests which has been and remains the touchstone of the nuclear powers' resolve to fulfill their obligations in the disarmament sphere. Of course, the achievement of the accords between the United States and the USSR on the elimination of intermediate- and shorter-range missiles and the possibility of a 50-percent reduction in strategic offensive arms are supported by the parties to the treaty. But at the same time they cannot fail to ask themselves the legitimate question: are the nuclear powers not about on this occasion also to take the path of streamlining their potentials while reducing their quantitative parameter. And the fact that the United States is refusing to unconditionally suspend nuclear testing and preparing for the creation of arsenals of third-generation nuclear weapons, that is, continuing the policy of ignoring nuclear disarmament commitments, will hardly escape their notice.

How might a failure to comply with these commitments be reflected in the fate of the Nuclear Nonproliferation Treaty? Its continued existence is frequently perceived as something which is taken for granted. To a certain extent such an assessment is brought about by the conclusion of the majority of parties to the treaty that the possession of nuclear weapons does not strengthen but weakens a state's security. However, this does not preclude the possibility of the withdrawal from the treaty of countries which decide that the acquisition of nuclear weapons corresponds to their security interests. This right is provided for in the treaty wording itself (article X). If some states have ideas on this score, it would be more profitable to them to use temporary participation in the treaty as a screen for accumulating the necessary technology and materials in order to subsequently openly embark on the path of nuclear armament on the pretext that the states which already have such weapons are not abiding by their treaty commitments.

Of more importance, essentially, is another problem: how long will the nonnuclear subscriber-states put up with the nuclear powers' nonfulfillment of their commitments? Of course, the conclusion that the nonproliferation process will be torpedoed when the treaty expires in 1995 would evidently be too categorical. The experience of the conferences monitoring the effect of the treaty testify that the nuclear powers and their allies are capable of overcoming their disagreements and demonstrating a high degree of interaction in preservation of the nonproliferation process. However, it would be a mistake to hope that the treaty might be preserved in the form in which it exists—without more precise commitments pertaining to a halt to nuclear testing. There is no doubt that the nonnuclear subscriber-states could make to the Nonproliferation Treaty changes which would be connected primarily with a halt to all nuclear tests. If, however, the nuclear powers prove to be not ready for these changes, the treaty in its current form really could be torpedoed—with all the negative consequences for international security.

II.

The Soviet-American negotiations on limiting and ultimately halting nuclear tests, which began in 1987, instill hope that the cardinal problem, on which the fate of the Nonproliferation Treaty depends, will be solved satisfactorily. But this hope may be justified only on one condition: if the United States and the USSR jointly recognize the urgency of a halt to all tests and take practicable steps to attain this goal. Such a prospect is not to be looked for at the current stage. The United States, as distinct from the USSR, which is ready for an immediate suspension of testing, is, as before, insisting on the need to continue nuclear testing and agrees to recognize a halt thereto merely as a distant goal. President Reagan's statement in the Congress (1987) said: "A treaty on a total ban on nuclear testing remains the United States' long-term goal. However, the conclusion of such a treaty must be examined under conditions where we are not dependent on nuclear deterrence for

safeguarding security and stability and only when we have implemented wide-ranging, deep and verifiable arms reductions and confidence-building measures and have achieved a greater balance in conventional arms."¹⁷ Given such cumbersome "conditionality," we may hardly hope even in the foreseeable future for the achievement of agreement on a total nuclear test ban.

The Reagan administration is incessant in emphasizing that it is first of all necessary to overcome the intermediate hurdles in a halt to testing—ratification of the 1974 Soviet-American treaty on limiting underground nuclear explosions and the 1976 treaty on underground nuclear explosions for peaceful purposes. What part might their ratification play in preventing horizontal nuclear proliferation? From the viewpoint of the majority of nonnuclear states the 1974 treaty testifies to an intention to streamline the nuclear arms race and shift the emphasis onto the continued upgrading and miniaturization of various types of nuclear warheads. A further lowering of the yield of nuclear tests and also the establishment of quotas therefor could also, evidently, be perceived as an endeavor to preserve the efficiency of the nuclear arsenal and increase the potential of tactical nuclear arms. Clearly, the significance of the agreements on a reduction in the yield of nuclear tests could hardly be compared with the significance of a treaty on a total ban thereon. It is perfectly natural that the majority of nonnuclear states demonstrates at best indifference to the fate of the 1974 treaty. The more so in that following the elimination of intermediate- and shorter-range missiles and a 50-percent reduction in strategic offensive arms, there could be an increase in the relative significance of the tactical nuclear weapons as yet not limited by any agreements between the United States and the USSR.

The nonnuclear countries' attitude toward the 1976 Treaty Limiting Underground Nuclear Explosions for Peaceful Purposes is of a contradictory nature. Some states, particularly countries which do not subscribe to the Nonproliferation Treaty, are continuing to emphasize their right to carry out such. Considering that the technology of nuclear explosions for peaceful and military purposes is the same, their continued legalization, to which ratification of the 1976 treaty will lead, cannot do anything other than harm the cause of nonproliferation. On the pretext of peaceful tests the "threshold" states could embark on the path of nuclear arms. The temporary renunciation by the United States and the USSR of all underground explosions for peaceful purposes would therefore seem expedient. Such an approach is supported also by a large group of countries which subscribe to the Nonproliferation Treaty, specifically, industrially developed countries. As in the case of the 1974 treaty, ratification of the 1976 treaty would make sense, if at all, only as an intermediate stage en route to the speediest suspension of nuclear explosions for peaceful purposes.

Of course, the realization of gradual steps is preferable to running in place. However, considering the interests of the nonproliferation process and the increased danger of

nuclear tests being carried out by the "threshold countries," the conclusion of a treaty on a total ban would be of paramount significance, from the viewpoint of which the main questions of the Soviet-American negotiations under way in Geneva on limiting and ultimately halting nuclear testing should be tackled.

Will the Nonproliferation Treaty depository-powers reach accords on a suspension of all nuclear tests prior to its expiration? The future of the entire nonproliferation process will depend on this. If not, the crisis of the treaty is inevitable. However, the other question of whether too much time has been let slip and whether in this time there will not be a breakthrough to the "nuclear club" of the "threshold" states remains open.

III.

The opponents of a complete ban on testing frequently express the opinion that it would contribute to the horizontal proliferation of nuclear weapons. The weakening of nuclear guarantees as a result of the impossibility of the further upgrading of the corresponding arsenal of the United States could force its allies to embark on the path of creation of their own potential to replace the American nuclear umbrella. This argument might be a model of formal logic, but it is too contrary to the actual aspirations of the majority of the United States' allies. West Europe, Japan and the ANZUS countries supported the Soviet-American agreements on the elimination of intermediate- and shorter-range missiles and advocated 50-percent cuts in strategic offensive arms and are expressing no doubt as to the dependability of the American means of deterrence in the event of a suspension of testing. On the contrary, they are expressing other misgivings—that the nuclear arms race might get out of control and lead to the increased danger of nuclear catastrophe, in which it is the United States' allies which would be the first and principal casualties. The most popular and promising foreign policy direction would seem to be the attempt of the majority of them to dissociate themselves from the nuclear preparations of the United States and to prohibit the deployment of nuclear weapons on their territory in peacetime. Such commitments have been and are being adopted by Denmark, Norway, Spain, Greece, Portugal, Australia, New Zealand and the Philippines; Japan continues to adhere to the "not to import, not to produce and not to acquire" nuclear weapons principle. The main opposition party in the FRG—the Social Democrats—is opposed to the presence of American nuclear weapons on West German territory. The allies of the United States, just like those of the USSR, are demonstrating devotion to the nonproliferation process and subscribe to the corresponding treaty.

In addition, the vast majority of them, just like the socialist, nonaligned and neutral countries, supports the idea of a complete halt to nuclear testing as a factor sharply impeding both vertical and horizontal nuclear proliferation. Addressing the third conference to monitor the effect of the Nonproliferation Treaty, R. Imai,

head of the Japanese delegation, voiced the prevailing opinion in this connection when he said: "My country has emphasized the importance of a test ban as an essential first step en route to nuclear disarmament.... A test ban is important from the viewpoint of prevention of both vertical and horizontal nuclear proliferation and would thus be a useful addition to the Nonproliferation Treaty process."¹⁶ The process of the consolidation of the nonnuclear states, regardless of bloc affiliation, on the question of a total nuclear test ban has become a reality of international relations. Evidence of this is the annual support in the United Nations by the vast majority of countries for resolutions calling for a complete suspension of nuclear testing and formulation of the corresponding agreement.

Politically, the conclusion by the United States, the USSR and also Britain of a treaty completely banning nuclear tests would lead to a strengthening of these powers' positions as the founders of the nuclear nonproliferation process and would facilitate solution of the question of a strengthening thereof and the imparting to it of a universal character. The other nuclear states—France the PRC—could hardly ignore its existence for long. It is expedient to recall that, following the signing of the 1963 Partial Nuclear Test Ban Treaty, France and the PRC have not carried out tests in the atmosphere since 1975 and 1981 respectively.

As of the mid-1980's France's underground nuclear tests on Mururoa atoll in the Pacific have been giving rise to a growing wave of criticism among countries of the Asia-Pacific region, which are fully resolved to force Paris to halt these tests. Protocol 3 to the Rarotonga Treaty on a Nuclear-Free Zone in the South Pacific (1985) makes binding the nontesting of any nuclear explosive devices within this zone. Although France (like the United States and Britain) has refused to subscribe to the Rarotonga Treaty, nonetheless, it will have to clarify relations in this connection with the countries which are participating in the nuclear-free zone. Describing its approach to nuclear disarmament, Paris, under the pressure of world public opinion, has officially been forced to declare that the United States and the USSR should initially radically reduce their arsenals and that only after this would Paris join in the negotiations on limiting its nuclear potential. The possibility of France preserving for even a short time the immunity of its nuclear testing program from an international treaty on a total nuclear test ban would seem extremely problematical. Despite the continued nonsubscription to the Nonproliferation Treaty, France, we would note, has officially declared that it will on these questions behave as a state which is a party to the treaty.

It is the general opinion of specialists that the PRC has a relatively modest program for the modernization of its nuclear forces. From 1964 through 1987 the PRC carried out approximately 30 nuclear explosions altogether. In 1987 the PRC subscribed to protocol 3 of the Rarotonga Treaty. Having undertaken not to be the first to use nuclear weapons and also never to use nuclear weapons

against nonnuclear states, the PRC has throughout the 1980's repeatedly advocated a reduction in the nuclear arsenals of the United States and the USSR. Just like France, the PRC has declared that it will abide by a policy of nuclear nonproliferation, while not formally subscribing to the treaty. Considering the PRC's political ties to developing and neutral countries which support a suspension of nuclear testing, it is not difficult to conclude that disregard therefor is not in the PRC's interests; it would sooner subscribe to it than endanger its long-term interests in the developing world.

IV.

The significance of a complete suspension of nuclear testing for averting horizontal proliferation shows through in particular relief if it is examined specifically for each "near-nuclear" country.

Approaching the end of the 1980's India is faced with the need to make a choice—either to take the path of the creation of nuclear weapons or head the movement of nonaligned and neutral states aimed at the elimination of nuclear arms, simultaneously leaving open the possibility of acquisition of such weapons and creating the industrial basis for this. The assertions that a decision on the question of whether India will be a nuclear power or not depends mainly on the behavior of its principal opponent—Pakistan—and also the PRC may be encountered frequently. However, this is just one factor, it would seem, determining India's position. The process of the nuclear arms race between the United States and the USSR performs the decisive role.

India has always given as the reason for its refusal to subscribe to the Nonproliferation Treaty the fact that it perpetuates the division of states into nuclear and non-nuclear and is discriminatory. The symbol of discrimination is the continued testing and the nuclear powers' advancement along the path of the creation of increasingly modern and refined arms systems. This to a large extent determines India's negative attitude toward Pakistan's proposal that they subscribe in concert to the Nonproliferation Treaty, undertake bilateral commitments not to create nuclear weapons, open the nuclear facilities for mutual inspection and create a nuclear-free zone in South Asia. At the same time, however, all proposals leading to a winding down of the global arms race meet with India's invariable support.

India has since the mid-1950's emphatically supported the conclusion of a treaty completely banning nuclear tests. Delhi regularly supports initiatives aimed at the complete elimination of nuclear arms. India constantly votes for UN General Assembly resolutions on a halt to the arms race and nuclear testing. India subscribed to the 1963 Partial Test Ban Treaty. When, in 1985, the USSR announced a moratorium on nuclear explosions, India headed the movement of leaders of countries of the five continents who called on the other nuclear powers to follow the USSR's example. In addition, India offered

together with its partners to assist in monitoring compliance with a total nuclear test ban.

Since the "demonstration" explosion in 1974, India has applied the brakes to its nuclear preparations. The R. Gandhi government's position of "restraint" on these matters is subject to strong pressure on the part of the military and political circles which believe that India is merely losing time in advocating radical disarmament and that India's position in the world arena and its security would be strengthened were it to embark openly on the path of nuclear arms and to continue testing explosive devices. Reflecting these views, K. Subramanian, director of the Defense Studies and Analysis Institute (Delhi), emphasizes the expediency of the following step: "...India must make its nuclear choice prior to 1995, before an attempt is made to make the so-called nonproliferation treaty permanent."⁷

In the absence of a total test ban treaty the impact of the supporters of the possession of nuclear weapons on the Indian Government's official position is growing. As the majority of experts believes, India is continuing to stockpile fissionable materials and assimilate technology which could be used for military purposes. Great attention is being paid to research efforts in aerospace technology capable also of serving as nuclear weapon delivery systems. The current fragile balance in India's position could not only be preserved but also emphatically in favor of the nonpossession of nuclear weapons by the conclusion of a world total nuclear test ban treaty.

Approaching the end of the 1980's, experts generally estimate, Pakistan has stockpiled and assimilated the fissionable materials and technology necessary to produce nuclear weapons. In an interview with TIME magazine of 30 March 1987 Pakistan President Zia-ul-Haq declared plainly: "You may write today that Pakistan is capable of manufacturing a bomb when it wishes."⁸ Various materials necessary for designing thenonuclear components of explosive devices have been purchased via secret transactions on markets of Western countries. Pakistan possesses nuclear weapon delivery systems—F-16 and Mirage aircraft—and is making efforts in the missile-manufacturing field also.

The Reagan administration's ending of compliance with the Symington Amendment in 1981 in connection with the events in Afghanistan dictated abundant military assistance, ensured political support and essentially removed significant barriers in the way of realization of Islamabad's nuclear ambitions. Throughout the 1980's the game of cat and mouse in which Washington would persuade Islamabad not to go further down the road of creation of nuclear weapons and thereby compromise the United States as a champion of nonproliferation, and Islamabad would deny any such intentions and simultaneously secretly and consistently act in the direction which it had planned invariably ended in Pakistan's favor. Its leaders skillfully and adroitly took advantage of the United States' interest in a strengthening of military

and political ties to Pakistan as an anti-Soviet spring-board for operations against Afghanistan.

As a result the United States has virtually forfeited, it would seem, any levers of influencing the future course of Islamabad's nuclear preparations. Even the U.S. Congress' suspension of military assistance, on which the Reagan administration had been insisting, will hardly make the Pakistani ruling circles listen to reason and have any pronounced impact on their behavior on nuclear issues.

Pakistani leaders have emphasized repeatedly, hinting at India, that were some neighboring country to conduct nuclear tests, the Pakistani people "would eat grass" to do the same. In the 1980's the Western mass media have reported repeatedly that Islamabad is preparing for such a step. Is it possible in the near future? If India carries out one more nuclear test, Pakistan's response will be immediate. But even if India shows restraint in these matters, it is hard to answer unequivocally "yes" or "no" to this question. On the one hand Pakistan would hardly wish to provoke India, inviting it to an open nuclear arms race in South Asia. Pakistani leaders recognize that they could hardly count in this event on military assistance on the part of Washington (Congress would block it conclusively).

There would at the same time be a sharp increase in tension in relations between the USSR and Pakistan also. From the technical viewpoint there is hardly any need to embark on tests of explosive devices at this stage of the nuclear program. On the other, Islamabad's ambitious aspirations to be the leader of the Islamic world and create not only a Pakistani but "Islamic bomb" are pushing it toward the unconcealed acquisition of nuclear weapons in spite of pragmatic calculations, the negative consequences being ignored. From this viewpoint the question amounts not to whether to conduct tests or not but to when to conduct them and on what pretext. As in the case of India also, a global nuclear test ban would be the most effective and, possibly, sole measure for preventing Pakistan's acquisition of nuclear weapons. Although Pakistan does not subscribe to the Partial Nuclear Test Ban Treaty, Islamabad regularly votes in the United Nations for resolutions calling for a total suspension of nuclear tests and officially supports the ideas of the nonuse of nuclear weapons and their elimination.

The nuclear rivalry in South Asia is inexorably turning this region into a hotbed of international tension in which the probability of the use of nuclear weapons in conflicts between the "threshold" states and the danger of the involvement therein of the nuclear powers themselves is increasing. A total nuclear test ban seems a modest price to pay for neutralization of the development of such a menacing prospect.

The greatest progress in the secret stockpiling of nuclear materials and the assimilation of technology is being demonstrated by Israel. The majority of experts agrees

that it has long been a "clandestine" nuclear state. According to testimony of the Israeli nuclear engineer M. Vanunu given in 1986, Tel Aviv could have at its disposal 100-200 nuclear weapons. In addition, some experts believe that the manufacture of a second-generation—hydrogen—bomb has already been assimilated under laboratory conditions, without testing even. Israel possesses aerial nuclear delivery systems. Jericho 2 missiles, which in terms of their specifications approximate intermediate-range missiles (up to 2,500 km), were tested in 1987 in the Mediterranean.

Israel gives as the reason for its refusal to subscribe to the Nonproliferation Treaty the fact that the latter is incapable of effectively preventing the proliferation of nuclear weapons. In this connection Tel Aviv has repeatedly expressed the opinion that a whole number of Arab countries (Libya, Iraq and such) subscribes to the treaty merely for the purpose of accumulating nuclear potential in order to use it for military purposes when this becomes necessary. Israel's bombing in 1981 of an Iraqi peaceful nuclear facility showed that Tel Aviv is prepared to accede to extreme measures if some neighboring country creates nuclear weapons.

At the same time, however, Israel's ruling circles recognize to a certain extent that other countries will hardly put up for long with its monopoly, albeit "clandestine," position as a nuclear state. At the present time the majority of Arab countries and also Iran are demonstrating a growing interest in the assimilation of nuclear technology. Of course, it is hard to believe that they will be able in the immediate future to attain the level of Israel's nuclear program. However, the intensification of efforts in this direction is obvious. It is no accident that the Arab states are concluding agreements on cooperation in the nuclear sphere among themselves and also with Latin American countries—Argentina and Brazil.

Foreseeing the possibility of future retaliatory measures on the part of Arab states, Tel Aviv is sedulously avoiding attracting international attention to the growth of its nuclear potential and emphasizing officially that Israel will not be the first state in the region to resort to nuclear weapons, that it will not henceforward destroy neighboring states' nuclear facilities and that it supports the creation of a nuclear-free zone in the Near East. One perceives behind all this an interest in additional measures which might lock in the existing distance in the nuclear sphere between Israel and neighboring countries. A nuclear test ban could be such a measure.

Israel is a party to the 1963 Partial Nuclear Test Ban Treaty. Objectively a further upgrading of Israel's potential could pose the question of the corresponding tests, particularly in the event of some "threshold" state venturing such to announce itself as a nuclear power. At the same time, however, fears of the negative political consequences of carrying out tests are as yet holding Tel Aviv back from such actions.

The majority of experts agrees that South Africa also could be classified as a "clandestine" nuclear state. Differences arise only in respect of the quantity of bombs which Pretoria is in a position to manufacture from its stockpiled fissionable material. A figure of approximately 20, and sometimes more, is cited.⁹ Pretoria has never concealed the fact that it intends acquiring nuclear weapons. Following India's explosion of a nuclear device in 1974, South Africa was close to carrying out its own test in 1977. Facilities being installed in the Kalahari Desert, photographs of which were obtained with satellites, caused hardly anyone in the West or the East to doubt that Pretoria was preparing to openly declare itself a nuclear state. Only a concerted diplomatic campaign by leading countries of West and East helped prevent the open appearance of yet another nuclear state. The interaction of the United States, USSR, Britain, France and other states became a precedent for curbing nuclear proliferation, which, unfortunately, has yet to become the rule of the nuclear powers' behavior. However, as the growth of the threat of proliferation from 1977 through 1988 shows, continuing the nonproliferation process will hardly be possible without such interaction encompassing spheres of the exchange of information and without close coordination of policy.

The United States' long flirtation with South Africa on nuclear nonproliferation issues in the 1980's has not led to the results for which the Reagan administration was hoping. Although it promised Washington that it would abide by the letter and spirit of the Nonproliferation Treaty when exporting its nuclear materials and technology to other countries, Pretoria flatly refuses to put its uranium-enrichment plants under IAEA supervision. At the time when the United States and Western countries were adopting economic and other sanctions in response to the white minority's racial policy, Pretoria began to actively play the nuclear card.

The probability of South Africa venturing to openly carry out nuclear tests to intimidate the national liberation movement, encourage the white minority and give the leading Western powers a "psychological slap in the face" for their unfriendly behavior is intensifying increasingly toward the end of the 1980's. The reason given for Pretoria's endeavor to acquire nuclear weapons has always been not so much military as political considerations. For South Africa, which has considerable superiority in conventional armed forces and arms to the frontline African states, nuclear weapons are hardly of importance for conducting military operations and, even less, for putting down racial unrest within the country. However, as a means of intimidating neighboring states and enhancing their political status in the eyes of Western countries nuclear potential—its development and buildup—has always been rated highly in the calculations of South Africa's ruling circles.

At a time when the very existence of the white minority regime could prove to be in jeopardy, its leaders are liable to agree to extreme measures even—to demonstrate their nuclear potential by carrying out a test. There

it is no doubt that it would be far easier for Pretoria to accomplish this action in the absence of an international total nuclear test ban treaty than were one to exist. Lest this happen, anticipatory actions of the nuclear states in the sphere of a suspension of all tests are essential right now.

Two Latin American "threshold" countries—Argentina and Brazil—are also continuing to stockpile nuclear materials and technology which could be used for military purposes. With civilian governments having come to replace in power military regimes there has been a lessening of the emphasis on military aspects of the nuclear programs, but there has been practically no slowdown in the pace of their implementation. In addition, Argentina and Brazil are cooperating with one another in this field and becoming exporters of nuclear materials and technology to developing countries.

Categorizing the Nonproliferation Treaty as "discriminatory," Argentina and Brazil are carefully protecting their freedom of maneuver on nuclear issues. They do not subscribe to the Tlatelolco Treaty banning nuclear weapons in Latin America and emphasize their right to carry out explosions for peaceful purposes and enrich uranium or regenerate plutonium from nuclear power station waste without supervision on the part of the IAEA. Increasingly great attention is also being paid in Argentina and Brazil to the development of independent aerospace nuclear delivery systems.

The approach of these two countries to the question of whether to create nuclear weapons or not will largely be determined by what happens in the world arms race and whether they will encounter the need for enhancing their political authority in the international arena to openly acquire nuclear weapons, as Britain, France and the PRC did formerly. These countries' attitude is largely reminiscent of India's approach. Without making the conclusive choice, Argentina and Brazil could take an interim step—without fearing the reaction of their neighbors, conduct tests of a nuclear device for peaceful purposes authorized by the Tlatelolco Treaty. Such a policy could be chosen also as an attempt to caution the nuclear states of the need to take stock of the political interests of the developing countries. This would seem particularly tempting for Argentina in the light of the unresolved dispute with Britain over the fate of the Malvinas (Falkland) Islands.

At the same time, however, it has to be noted that Argentina and Brazil support the idea of a global nuclear test ban as the most effective step on the way to a halt to the nuclear arms race. Argentina has signed, and Brazil, signed and ratified, the 1963 Partial Test Ban Treaty. Together with India Argentina participates in regular meetings of representatives of the five continents designed to put an end to nuclear testing. Brazil was the initiator of the declaration of the South Atlantic as a zone of peace free of nuclear weapons. There is hardly any doubt that Argentina and Brazil would subscribe to a total nuclear test ban treaty.

Thus a treaty could have a decisive impact on the choice of each "threshold" country examined above in favor of the nonnuclear path. The vast majority of them will be oriented on these issues by the future policy of the leading nuclear powers.

V.

A total nuclear test ban would create powerful political barriers in the way of the acquisition of nuclear weapons by the countries which remain outside of the Nonproliferation Treaty. It would be extremely difficult for them from the political viewpoint to reject a treaty which had gained worldwide support and which, as distinct from the Nonproliferation Treaty, could not be criticized as "discriminatory". Such an agreement, imposing equivalent obligations on both the nuclear and nonnuclear states, would be an important organic component of the entire nonproliferation process. Its signing by countries which are not party to the Nonproliferation Treaty could be a prelude to their subscription to the latter.

The assertion that even the participation of the "threshold countries" in a total test ban treaty would not stop their advance along the path of the creation of nuclear weapons may be heard frequently. Technically the possibility of carrying out such tests on laboratory benches does indeed exist. But it is within the capabilities only of the states which have a high degree of technological development in this sphere (only Israel, evidently, may be put in this category). But even for them the moment could sooner or later come (as was the case with the five present-day nuclear powers also) when it would be necessary to conduct tests to determine the efficiency and further upgrading of this nuclear arms system or the other. In this case a total nuclear test ban treaty would essentially be a decisive barrier to the adoption of a political decision to conduct such.

Thus implementation of a program to create efficient nuclear forces could be halted at an early stage. At the same time the political impact of a total test ban treaty on the behavior of the "threshold" countries would be extremely palpable. Treaty commitments not to carry out tests would play the same part as the Nonproliferation Treaty commitments of the states which have the industrial base for acquiring nuclear weapons, but are not creating them. It should be recalled in this connection that President J. Kennedy's assumption concerning the possible appearance of 15-20 nuclear states in the 1970's has not become a reality merely thanks to the existence of the Nonproliferation Treaty and the adoption by the majority of its subscribers of political commitments not to create nuclear devices.

However negatively this treaty itself has been viewed, the "near-nuclear" states which do not subscribe to it are forced to reckon with the policy pursued by the vast majority of countries.

So that even if some "threshold" countries remain outside of a total nuclear test ban treaty, its existence and

support therefor by the world community would be a factor with which they would be forced to reckon.

The conclusion of such a treaty would permit the nuclear states to occupy strong positions in the sphere of non-proliferation and afford an opportunity for the adoption of joint or parallel sanctions against states which attempted to carry such tests.

The task of the search for more efficient approaches to neutralization of the real threat of horizontal nuclear proliferation is arising toward the end of the 1980's. The new political thinking requires recognition that strengthening the nonproliferation process is possible only with the aid of a total nuclear test ban. The surest method of preventing the enlargement of the "nuclear club" is to disband it. A complete halt to nuclear testing would be eloquent testimony to the leading powers' intentions to begin consistent movement toward this goal. Neither the United States, the USSR nor the other nuclear powers can permit themselves the "luxury" of testing increasingly new types of arms for continuation of the nuclear arms race, which would rebound against vitally important interests of their national and general security.

Footnotes

1. "Arms Control and Disarmament Agreements. Texts and History of Negotiation. U.S. Arms Control and Disarmament Agency," Washington, 1977, pp 84-86.

2. UN Document. A/C. 1/pv. 1556.
3. Jimmy Carter, "Three Steps Toward Nuclear Responsibility" (THE BULLETIN OF ATOMIC SCIENTISTS, October 1976, p 11).
4. "Disarmament. A Periodic Review by the United Nations," vol VIII, No 3, Winter 1985, pp 89, 95-97.
5. "Statement Submitted to the Congress by the President. 1988. Arms Control Impact Statement, June 1987," Washington, 1987, p 18.
6. "Disarmament..." p 55.
7. "India and the Nuclear Challenge". Edited by K. Subramanian, New Delhi, 1986, p 10.
8. "Pakistan. Knocking at the Nuclear Door" (TIME, 30 March 1987, p 14).
9. L. Spector, "Going Nuclear," Carnegie Endowment for International Peace, Cambridge (Mass.), 1987, p 230.

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"Mirovaya ekonomika i mezhdunarodnyye otnosheniya", 1988

FEDERAL REPUBLIC OF GERMANY

Paper Comments on U.S. Stand on Nuclear, Chemical Proliferation

AU10901142989 Hamburg *BILD AM SONNTAG*
in German 8 Jan 89 p 2

[Herbert Kemp commentary: "Why Are the Americans Our Friends, Suddenly Against Us?"]

[Text] There has not been such a clash between Bonn and Washington for a long time. In a rude manner, newspapers and television are accusing the FRG of helping the Libyans produce chemical weapons. To date, however, the U.S. Administration has not furnished a single piece of evidence.

"Auschwitz in the sand," a U.S. daily wrote. Chancellor Kohl was furious. The comparison between the FRG and the Nazi regime and its crimes is outrageous—much worse than the former description of Reagan as a "warmonger" by left-leaning German papers.

- The Germans are not as honorable as they pretend to be. Iraq is producing nerve gas at a factory, in the construction of which the FRG was involved, and which was to have produced pesticides. The case was uncovered in 1984 and has not been concluded to date. Iraq has meanwhile used the poison in its war against Iran.
- The international success of the German chemical industry is a thorn in the side of the United States. The allegations are (poisoned) weapons that are being used in the competition.
- The United States is also concerned about the German nuclear industry. Papers are claiming that the FRG has supplied materials (enriched uranium, heavy water) and parts of plants to Argentina, India, Israel, Pakistan, and South Africa, which can be used to produce the "bomb." These examples are not far-fetched, as has been demonstrated by the most recent case of the NTG (New Technologies) company in Gelsenhausen (the delivery of plant parts to Pakistan).
- However, there are also other causes for irritation on the part of the United States. Tensions are mounting within NATO because of low-altitude flights, troop status (remainders of the occupation laws and regulations), and resistance against the modernization of U.S. nuclear weapons in Europe.
- The admiration for Gorbachev ("Gorbymania") in the FRG has aroused distrust among many Americans. Genscher is regarded as the "court propagandist" of the Kremlin leader because of his incessant publicity campaign for Gorbachev.
- In addition to that, a trade war has been triggered between the EC and the United States (because of

hormone-treated meat). The atmosphere is gloomy. Money is at stake, and this is where the alliance partners get down to tough business.

Siemens Denies Involvement in Chemical, Nuclear Proliferation

AU1001092589 Frankfurt/Main *FRANKFURTER ALLGEMEINE* in German 10 Jan 89 p 2

[K.B. report: "Siemens Denies Involvement in Libya"]

[Text] Bonn, 9 January—At its session this Tuesday [10 January] the FRG Cabinet will decide on the composition of a delegation that will exchange information with U.S. experts in Washington this week on the suspicion that German companies have been involved in the construction of the chemical plant in Libya. Economics Minister Hausmann will report to the cabinet about the new findings of the German authorities in their investigations into further companies.

Another interim result of the investigation of companies was announced by the Hamburg Higher Financial Directorate on Monday, which has concluded a foreign trade check on the branch office of the Hong Kong Pen-Tsao-Matena-Medica Co. In connection with the U.S. accusations against the Imhausen-Chemie Co. in Baden-Wuerttemberg, which has in the meantime been exonerated by the results of the official investigation, the Hamburg branch office had also come under suspicion. The Higher Financial Directorate announced that a check on all documents of the import and export deals of this company has not revealed any evidence that chemical equipment or design documents for the construction of the chemical plant have been sent to Aj-Rabiah. The investigation of exports to other countries has not yet been concluded.

As regards television pictures that show a container labeled "Siemens" in front of the chemical plant, Siemens Co. states that it has nothing to do with this plant. This container can come only from a building site where Siemens participated in the construction. It is no secret that Siemens has business connections with Libya, for export regulations are, however, strictly observed.

Responding to the accusations that Siemens is involved in the deliveries of nuclear equipment to power plants in India and Pakistan, the company says that it observes the national and international regulations and conditions concerning such exports. It is confirmed that Siemens-Kraftwerksunion (KWU) delivered equipment for one reactor in India and one in Pakistan. This technical equipment serves the increased safety of the two power plants. Both Pakistan and India have voluntarily subjected themselves to inspections of their facilities for the peaceful use of nuclear energy by the IAEA in Vienna, even though the two countries have not signed the Nonproliferation Treaty.

Bonn To Approve Stricter Laws
*AU1001103989 Munich SÜDDEUTSCHE ZEITUNG
in German 9 Jan 89 p 1*

[Pub report: "Bonn Announces Stricter Laws Against Illegal Exports"]

[Text] Bonn—The cabinet intends to approve stricter foreign trade laws on Tuesday [10 January]. There are plans to introduce stricter controls concerning the export of nuclear and chemical plants, and to drastically increase fines for illegal exports. During a meeting on the sidelines of the Paris chemical weapons conference, Foreign Minister Hans-Dietrich Genscher and his U.S. counterpart, George Shultz, agreed to have the charges concerning the involvement of German companies in the construction of an alleged poison gas factory in Libya examined by a commission of experts from both countries.

In a public statement, Shultz stressed that the United States "fully trusts" Genscher and Chancellor Helmut Kohl. Bonn has announced that it will also amend the laws if that is necessary to prevent German participation in the spread of chemical weapons. Genscher subsequently stated that he is "convinced" that, with the clear statements by Shultz, the matter is now closed.

The chancellor and the foreign minister made it clear in Paris and Bonn on the weekend that so far they have no information that the U.S. charges concerning German participation are accurate. In an interview with *Sueddeutscher Rundfunk* [South German Radio], Kohl stressed that he still is not in a position to support the U.S. charges. It is inconceivable for him that "individuals in the FRG, or German companies, should participate, out of greed for profit, in projects that could in any way endanger peace in parts of the world." It is important now to leave the realm of suppositions and allegations. He will be the first to react on this matter with the full severity with which the state is capable of reacting. However, that is only possible if the accusations are proved in detail.

Economics Minister Helmut Haussmann, the cabinet member responsible for the foreign trade law, intends to suggest a number of measures to the cabinet on Tuesday. As the minister pointed out in a television interview on Sunday [8 January], the Office for Industry and Trade will be even more streamlined, its members will receive additional training, and the personnel will be increased to be able to examine "sensitive export permits." Applications have always been checked carefully by experts, he stressed. In the case of the Transnuklear company, which has allegedly exported nuclear facilities to Pakistan, no application has been received. It is now important to increase the capacities of the customs investigation authorities, who are basically export police. Haussmann also wants to suggest that certain control mechanisms that have been developed for East Bloc countries and are currently under discussion be applied to other countries as well.

Changes are planned regarding fines for illegal exports. The term of imprisonment, which has been 3 years up until now, should be extended to at least 5 years. In accordance with this, Haussmann also intends to suggest an increase in the fines. Care must be taken to ensure that not all companies that export important goods are subjected to tedious bureaucratic measures, Haussmann emphasized. What is important now is to concentrate examinations on the few sensitive products and the sensitive countries that receive the exports.

After the meeting with Shultz in Paris, Genscher pointed out that Bonn and Washington have the same aim of preventing the spread of chemical weapons. The FRG is the only country that has undertaken not to produce chemical weapons and to willingly submit to checks. Bonn is determined to prevent German firms from spreading such weapons. Any information about such matters will therefore be pursued "in all seriousness."

The German-U.S. discord over Libya will also be among the topics that CDU/CSU Group Chairman Volker Ruehe will discuss in the United States. He left for the United States on Sunday [8 January]. Ruehe will meet with, among others, Beni Scowcroft, the new security adviser of President-Elect George Bush.

Human, Technical Failures in Reactor Operations Cataloged

*51002411 Hamburg DER SPIEGEL in German
12 Dec ~ pp 87-95*

[Unattributed Article: "We Had Fabulous Luck"]

[Text] The operators of the Biblis atomic power plant and the supervisory authorities kept the most serious incident to date in the history of West German nuclear technology secret for almost a year. The record of this instance of trouble refutes the safety policy of atomic energy generation at its weakest point: human failures in handling a highly complex machinery system are not predictable.

Germany's atomic managers were not able to be really happy last year during the quiet time before Christmas Eve. Instead of the usual Christmas celebrations, there were hectic crisis meetings.

Determined state's attorneys, equipped with search warrants, showed up at almost all atomic plants in West Germany. According to investigation results, the Hanau transportation company which goes by the name of Transnuklear had bribed power plant personnel with millions in order to be able to sell radioactive waste with a hefty profit to Belgium without any controls.

Federal Environmental Minister Klaus Toepfer (CDU) reprimanded the "scandalous and probably also criminal action" of the atomic industry. Every evening, television, in the "Daily Review" and the "Journal Today" programs, brought news about the atomic waste cheats and their compliant customers in reactors in Stade to

Biblis, in which fellow workers were caught in the deep swamp of corruption.

But the television news was cut off suddenly on 17 December of last year. Before the gates of the Biblis Nuclear Power Plant, ARD [Working Group of FRG Broadcasting Institutes] reporter Christoph-Maria Froehder had to turn around without doing his job—approval to film had been withdrawn during the night. When the reporter complained to the Essen headquarters of the RWE (Rhine-Westphalian Electricity Works, Inc.), syndicate spokesman von Buelow informed him stonily: there is "at this time no interest in anybody doing any filming in Biblis."

This becomes understandable in the light of hindsight. That was the day the cameramen could have been able to film power plant personnel wearing masks and protective clothing during cleanup work—outside the reactor's containment. Reporters might possibly have been able to ask penetrating questions as to what this work was all about. And truthful answers, the RWE managers had reason to fear, could presumably have led to the immediately closing of the reactor during the time before Christmas 1987 when there was much skepticism about atomic power.

At least a week before Christmas, there was trouble in Biblis-Block A, the world's hitherto most productive atomic power plant which has a record of hundreds of billions of kilowatt hours; that was the kind of trouble which should not arise at all according to the safety concept for reactors of this type.

A short-time leak had been sprung as a result of an operating mistake. And highly radioactive cooling water was escaping from that leak to the area outside the containment, where it is irrevocably lost for the cooling water supply cycle. Within a short time, the entire cooling system could have collapsed and could have melted the reactor's core.

It was possible to prevent the super-GAU [worst-case accident], the uncontrollable atomic accident, because a negligently opened valve did close after all at the right time. "We had fabulous luck last year in Biblis," commented Darmstadt reactor safety expert Lothar Haha at the end of last week on the events which became known only gradually.

The daring maneuver of the reactor crew in Biblis, one of the worst examples of trouble in the history of West German nuclear power plants, once again revealed how close to the abyss of a big nuclear disaster the West German atomic power plants are operating.

The complexity of the installations, by means of which the atomic fire must be mastered, always exposes technicians and engineers to the danger of being overwhelmed by a sudden, unforeseen events. Locked up in their windowless control centers, studded with hundreds of dials, warning lamps, and monitors, they must, mostly within minutes and even seconds, make decisions upon

which millions in profits or losses of their employer, but, in the worst case, also the lives of millions of people, will depend.

Regardless of what the theoreticians of reactor safety can calculate with the help of semiscientific analyses about the probability of major atomic disasters, their theories become nothing but so many scraps of paper when they have to deal with man, as a source of error, which has been proved by the Biblis case.

If, as happened in Biblis, the overwhelmed "reactor drivers" (industry slang) resort to means that are not anticipated in any risk analysis, these West German atomic piles, which have been praised by Federal Chancellor Kohl as "the world's safest plants," quickly become disaster sources of incalculable dimension.

But this is precisely what the public was not supposed to learn if the West German atomic community and its helpers in the licensing authorities had their way. For almost a year they tried to keep the negligent handling of damaged valve systems in the Biblis pile secret and, according to the conservative daily DIE WELT, they plunged the atomic industry into an "acute crisis of credibility." "The public was fooled with practiced smoothness," said ARD commentator Georg Hafner irritably. STUTTGARTER ZEITUNG found that the managers of the atomic industry had "not learned anything from old mistakes." Whenever "things become really dangerous, they resort to secrecy, they play things down, and they hush things up."

Public ire, which was unleashed at that time, was aimed not only at the arrogant gentlemen of atomic electric power. Chancellor Kohl's proatomic administration was completely caught up in the maelstrom; the charge of secrecy and whitewash also hit his Minister Toepper and once again there was suspicion of collusion between the nuclear lobby and the government atomic inspectors.

And so it happened that the chancellor, at the beginning of last week, for a short while toyed with the idea of sealing up the Biblis A atomic pile by a sovereign act of government. Only drastic punitive action, Kohl and his helpers figured, could restore the administration's credibility. The time had come to let everybody know: "Something is going to be done about this." But nothing was done.

On second thought, Kohl recalled the real power of his atomic industry friends. And he does not want to deviate from his atomic policy under any circumstances. He promised that he was determined, after his initial anger had evaporated, talking last week among a small group of intimates, to push Kalkar through and to operate the breeder also "as a research reactor." Wackersdorf was also going to be built. In the meantime, power plant operators and politically responsible officials tried with all means again to calm the fear of atomic power which was once again spreading among the population.

But, smack in the middle of the series of committee meetings and improvised press conferences, burst the news, spread by Schleswig-Holstein Social Welfare Minister Guenther Jansen, that two serious incidents which took place in May and September in the Stade reactor before the gates of Hamburg had also been kept secret until now.

The attendant risk of course had not been comparable to the risk in Biblis but Lower Saxony's Environmental Minister Werner Remmers also had to admit that he was not informed about the damage to the reactor's cooling system at the right time.

At the same time, the office of the Darmstadt state's attorney announced that it would institute investigative proceedings against the responsible engineers and managers on the basis of the facts now published concerning events in Biblis. According to State's Attorney Klaus Schmidt, "there is justified suspicion as to the negligent release of ionizing radiation." As had happened until now in the case of all major accidents in atomic power plants, the incident in Block A of the Biblis power plant had started with an initially harmless defect.

For 2 days this mighty installation, that tremendously complicated structure consisting of oversized boilers and generators, hundreds of pumps, auxiliary pumps, and emergency power units, thousands of pipelines, valves, and measurement instruments, had been idle because of a repair on the so-called steam generator. In the spot where the laboriously tamed energy deriving from billions of split uranium nuclei is transferred from the highly radioactive, extremely heavily pressurized water of the strictly screened "primary circuit" by means of heating coils to the steam circuit of the turbine, a small leak had sprung the day before and that had made it necessary to shut the plant off.

Now, around noon of 16 December, after millions had been lost due to the plant being idle for 3 days, the system was to be started up again. The nine-man morning crew quickly went down the checklist in the control room and initiated the start-up operation. According to regulations, the men were also looking at the closing mechanism of valve No TH22 S006.

When the reactor is idle and when there is less pressure in the reactor cooling system, this valve is opened by means of an electric motor so that the so-called after-heat can be evacuated with the help of the emergency cooling systems. If this flap is open, then a little red light goes on in the central control room above the corresponding operating knob.

The valve must under no circumstances remain open when the reactor is run at high pressure. This is because that particular part of the emergency cooling system is not designed to withstand the tremendous pressure of 155 bar, such as it prevails in the reactor circuit, about 155 times normal atmospheric pressure. Another knob on the operating console releases the valve for closing; that is done automatically (with the help of a check

valve) the moment the steam pressure in the reactor rises. After the valve has been closed, a little "green" light goes on.

But on that afternoon, TH22 S006 did not close. The green lamp next to the release knob remained dark. The operating personnel tried, according to an in-house report of Toepfer's ministry last week, "to close the valve by once again opening and shutting it." This maneuver had been successful on earlier occasions and this is why something grave happens only in the heads of the atomic power plant workers: although the little green light did not go on, the men in the control room did not conclude that the valve was still open but interpreted it as "indication error" (Toepfer report): "This assumption was not checked out any further...and the start-up process was continued."

Hundreds of readings and short-term alarm reports now reached the 10-meter long desk in the control stand and by far most of them had higher priority. This meant that the continuing "not-closed" report concerning valve TH22 S006 was "overlooked also by the next two shifts," so that the completely clear trouble report remained undiscovered for a total of 15 hours.

"During all of the confusion of the start-up operation," according to power plant manager Fred Meyer, the men also disregarded the second piece of information supplied by the reporting system. On one of the three monitors, that flicker on the front wall of the control panel, there now appeared, in the clear, the notation "after-cooling system operational readiness state disturbed." There is a system behind the fact that the crew did not pay any attention to that report. This is because the line (which also does not permit any conclusions as to the cause of the trouble) shows up only on a secondary monitor whose indications are considered "less important" (Meyer).

The men during the next two shifts did not fare any differently; they had their hands full, watching all over other installations during the start-up process. Hour after hour, the pressure in the reactor boiler and in the cooling circuit kept rising—and because the valve was still open, it also exerted pressure on the connecting piece between the after-cooling installations: only two so-called second barriers kept it away from the much too weak pipelines outside the containment.

At the same time, the heavily pressurized water also forced open an overflow valve between the first and the second blocking device, small quantities of water, with a temperature of 306 degrees, thus got into the pipe labyrinth below the pressurized boiler.

The inspectors in the control room were not able to register this process either. This is because the "position indication" of this valve failed, on that day, of all days.

Only during the early morning hours of the following day, specifically at 0303, did a hard-pressed reactor driver notice an alarm indication which the men at first

did not understand at all. A heat sensor indicated rising temperatures in the processing plant for the cooling water whose sensitive artificial resin filters threaten to melt when the heat becomes too strong.

Only now did the men realize clearly that something was wrong. Immediately, they once again analyzed all reports. Another 2 hours went by; the reactor long ago had begun to run at full power and it was under full pressure when they finally found out what everybody had failed to notice until then: valve TH22 S006 was still open, quite in violation of regulations, and there was only a single barrier separating the radiating reactor content from the unprotected environment.

It now appeared unavoidable that the reactor had to be turned down again, that it had to be slowed down slowly. Only at low pressure, around 30 bar, is it possible to operate the valve mechanically. But that would imply more heavy losses to the operating company. It would be necessary to write off at least one day of full-load operation, in other words, it would be impossible to produce and sell just about 24 million kilowatt-hours. Besides, there would be reason to expect unpleasant inquiries from supervisory authorities, it would be necessary to write reports, and outside expert opinions might possibly be called for.

At that point, one of the men had an idea. He proposed to his superior that one might try to loosen the stuck valve. Even a brief flow in the pipeline should after all suffice to get the check valve moving again, briefly to open a valve located behind it, and then the problem would solve itself.

The proposal was plausible and this procedure was even standard practice in power plant engineering. The only trouble was that neither the technician, nor the shift manager, realized which of the many pipeline systems they were dealing with. Instead of checking the circuit diagrams as a precaution to find out where the line behind the second valve would lead, they simply acted on the proposal.

Following a brief application of pressure upon the valve motor that can be started for "tipping operation," they lifted the valve flap a little and the monstrous event happened: the stuck first blocking device remained open and, at supersonic speed, the pressure wave raced through the hot water masses into the connecting piece of the emergency cooling system and then into the checkout pipeline whose valve now was also open and, outside the containment, it shot the more than 300-degree hot, radiating steam through an overpressure valve into the open space of the so-called torus. No safety calculation, no risk analysis had ever anticipated that case.

With just a few hand motions, a connection had been created which should not have existed: the hot, heavily pressurized primary circuit was now connected into unprotected rooms outside the containment.

The men were just lucky that this state lasted only 7 seconds. Only 150 liters of expanding hot steam escaped through the safety valve and then the "tipped" second blockage valve was closed again. If it had become stuck, as had the first valve, the power plant workers would have been forced to watch helplessly as their reactor lost unrecoverable cooling water into the torus, from which it would have gotten out into the open automatically where it would then contaminate the environment.

And so the operating crew in Biblis merely had a big scare—but, all at once, the entire safety philosophy of nuclear engineering was upset. This is because it is especially this type of incident which designers, operators, and their scientific helpers had always termed as being extremely unlikely and which therefore had been categorized as acceptable risk.

Knowing full well the far-reaching significance of the incident in the torus of Block A, the responsible managers of the RWE syndicate systematically tried to keep the facts secret; this was an undertaking which the cumbersome bureaucracy of the supervisory authorities for a long time had nothing to counter with. For months, the government atomic experts in Wiesbaden and Bonn stumbled around in the dark before, in September of this year, they at last realized the real danger to which millions of inhabitants around the pile in Southern Hesse had been exposed for the past 9 months.

And so, the responsible officials of the RWE giant power plant outfit on 22 December, 5 days after the event, discharged their duty to make a report to the Hessian Environmental Ministry, but, as Environmental Minister Weimar protested, they described this incident "in a patently false fashion." They simply put it in category "N" (Normal). On top of that, in their report, they avoided any reference to the negligent handling of the valve in the check line, the last barrier to the loss of the absolutely indispensable cooling agent.

These rather scant statements at first even caused the officials in the Wiesbaden ministry to become suspicious; this is why, during that same week, they requested an expert report on the assessment of this incident from the Bavarian TUEV [technical inspection agency]. Only 2 months later, at least the supervisory authority learned of the "massive human failure" (State Secretary Manfred Popp) of the reactor crew through the research that was done by the persons preparing the expert report.

But, along with this result, the experts from the TUEV, who are tied to the atomic industry by a long common history, at the same time also supplied a rather soothing formula which was designed to enable all those involved to extricate themselves, at any rate, until last week. "Because of the short duration of this condition," so it says in the expert report, "there was no threat to the integrity of the shutoff system." In spite of operating errors, a serious accident had been "sufficiently unlikely."

Thus calmed down, Weimar's State Secretary Popp and his officials probably saw no reasons for reporting the incident at least now. The experts of the semiofficial "Reactor Safety Company" brought it up for discussion during a regular meeting of the "Reactor Operation Inspection" federal-state working group at the end of April of this year. During the "routine inspection," the appropriate officials of the Federal Environmental Ministry justified themselves last week, "suspicion arose in March and April" to the effect that "this might have involved an event of major significance."

But then another 3 months went by until the RSK (Reactor Safety Commission), which is attached to the Federal Environmental Ministry, went into a fundamental reevaluation of the Biblis incident. Only then, early in September, did the supervisors in Wiesbaden award the incident at least the second highest urgency classification of "U" (Urgent). Another 6 weeks passed until, on 12 October, the atomic crew of Environmental Minister Toepfer also at last decided, in a circular letter addressed to all state authorities, to demand that all comparable reactors be retrofitted in this fashion in order in the future technically to prevent similar incidents.

But, obviously, at no point in time did the group of those initiated into this event, whose membership in the meantime had grown to more than 100 experts, get the idea of informing the public and thus facilitating an assessment by unbiased experts.

On the contrary: they continued to classify all analyses and reports sent out as "Confidential" and "Secret." Even the report to the atomic agency of the OECD, which went out only in September, was labelled "Industrial Secret," with the consequence that any reference to the location of the reactor involved was expunged from the subsequent report to the member states.

West Germans owe the fact that the incident nevertheless did come to light only to the research of some staff members of the American technical publication NUCLEONICS WEEK. In a sober but precise fashion they disclosed that the reactor drivers of Biblis had risked precisely that kind of leak about which it was stated in the major reactor safety study of the NRC, which was prepared already in 1975, that the system involved could "fail because of overpressure, which would trigger the nuclear meltdown and cause the escape of radioactivity outside the containment."

At the same time, the publication reported about the astonishment of NRC experts on the lax way in which the German authorities handled this entire incident. "If this had happened in an American power plant," said one NRC inspector, "then we would without any doubt have had an inspection team on the spot within a matter of hours." The plant would certainly "have remained closed down for a long time."

But criticism from abroad was of little concern to the German atomic officials. To be sure, Atomic Minister

Klaus Toepfer had promised last May that it was necessary "to provide complete and open information for the purpose of restoring confidence in a successful nuclear industry." But, when it came to providing information on the Biblis incident, Kohl's environmental propagandist, according to the former Green Environmental Minister Joschka Fischer, "turned from a Lazarus of environmental policy to the Judas of the population's security interests."

In a rather cheeky fashion, Toepfer maintained that the charge of whitewash was "completely unfounded," that there was "at no time" any danger of a super-worst-case accident, and that this was not an event involving a "special problem." Said Toepfer: "We did not keep anything secret and we will not do so in the future either."

The exact opposite is true because, even after the initial news releases, Toepfer and his advisor Adolf Birkhofer, chairman of the Reactor Safety Commission, and State Secretary Popp, tried to embellish the Biblis game of chance according to all rules of the game.

Trusting in the ignorance of the public, they spread the news to the effect that "another three emergency cooling systems" would have been available after all if the leak had not been plugged. But the fact is that all installations for these systems stand in the circular space outside the containment which would have been filled with hot, radioactive steam within a very short time. The installations positioned there however are not protected against such exposures. One would have had to expect them to fail.

Then again Birkhofer's people asserted that only in case of a "concatenation of very many failure mechanisms, with very low probabilities, one could under certain circumstances also not have ruled out a nuclear meltdown." Besides, in the case at hand, "there were still considerable possibilities for taking proper action."

In point of fact, everything in Block A of the atomic power plant on the Rhine depended on the fortunate closing of the mistakenly opening valve of the weak checking line. That, at any rate, was also the judgment of experts from the Reactor Safety Company who were financed by Toepfer. With the valve open, they wrote in a subsequently submitted circular to the authorities of the federal states, dated 12 September, "the building enclosure itself likewise would not have guaranteed any safe plugging of the leak." By the same token, "the sealing of the containment is not guaranteed" for this case.

Here is what that means in plain language: one would have to expect the pipelines behind the opened valves to burst. If the leak had been located outside the containment, then cooling water would relentlessly have escaped from the primary circuit and there would have been no way of pumping it back into the system. "When that happens," concluded reactor expert Michael Sailer, an

employee of the Darmstadt Economic Institute, "then no safety system is any good any more and that cannot be denied."

Moreover, Toepfer and RSK boss Birkhofer concealed a series of other ugly details connected with the incident last year.

In-house records of the Reactor Safety Company indicate that, hours before the incident that was published last week, a similar event had taken place. About 150 liters of radioactive cooling waters had escaped into the circular space around the containment via an open connecting line and an overloaded safety valve right at the beginning of the so-called starting procedure.

The government atomic inspectors also tried to hush up the fact that the disregarding of the report on the open valve TH22 S006 was by no means a mere oversight. Instead, the reactor drivers learned that numerous indications on their control panel again and again signaled false messages. This is why they did not take any countermeasures, a habit that is as understandable as it is dangerous, a habit which Toepfer and his advisors had wanted to keep absolutely secret.

Also hushed up was the fact that it was not due to the special alertness of the third shift crew that the open valve was discovered at last; instead, this again was only due to a lucky coincidence. The crew in the end at last believed the report to the effect that the blocking mechanism was still open only because, via detours, a small quantity of hot water, according to an inspection official, "was wandering through the pipelines" and had gotten into a temperature-sensitive filter of a purification system.

As if the Chernobyl disaster had never happened and as if there had been no Hanau atomic scandal, the gentlemen of atomic electric power and their inspectors in the ministries continued the tradition of "system-related concealment" (SUEDDEUTSCHE ZEITUNG), such as it has always been inherent in the West German atomic industry.

It was above all the really serious cases of human and technical failures that reached the public always only by accident and via detours. Here are some outstanding examples:

To save its company millions in losses, the crew operating the boiling-water reactor in Brunsbuettel in June 1978, in violation of all regulations, deactivated the automatic shutoff mechanism and radioactively contaminated hot steam escaped into the environment for many hours. But, according to the findings of an investigating commission later on, the "switch positions necessary for this unauthorized action had been set in three different rooms and, in those rooms, in previously locked cabinets." The operating company maintained, contrary to the truth, that the shift boss only "slightly altered the response figures."

In the shadow of radiation from the Chernobyl fallout, the crew of the high-temperature reactor in Hamm-Uentrop in May 1986 allowed cooling gas, radioactively contaminated with 90 million Becquerel, to escape out into the open through the chimney. For almost a month, the power plant managers denied any irregularity until staff members from the Economic Institute published a detailed and well-researched report on the incident.

For years on end, the managers of the Hanau Plutonium Firm Alkem handled its highly dangerous bomb material as if it were contraband: secretly and illegally, they stored several hundreds of kilograms of the most toxic and explosive of all fission materials in a depot belonging to a friendly firm in Belgium starting in 1978, circumventing all international inspections and risking diplomatic entanglements across two borders. This irresponsible handling of this heavy metal became known only because state's attorneys 8 years later confiscated the files of the pertinent ministries.

Biblis Block A long ago earned a firm place on the list of breakdowns. RWE, the operator, always tried not to let too much of this get to the public. Critics speak of "well-planned information denial."

Only months later and often only after searching questions from environmental associations did the power plant bosses of Biblis A admit that:

- 20 screws were found during a routine inspection in the reactor pressure vessel in 1976; the steel pieces, 100 mm long and 16 mm thick, came from the main cooling pump, the very heart of the vital reactor cooling system;
- in 1976, likewise, a fresh-steam slide closed automatically several times; the cause remained unknown and experts still refer to this incident as the "witching hour" of Biblis;
- 28 broken or damaged screws held a frame that must guarantee the safe arrangement of the fuel elements in the reactor pressure vessel along the core container in 1980.

Again and again, there was damage to valves in the reactor and radioactivity was released out into the environment also relatively regularly. At times, the workers had to wear protective clothing for hours and had to inhale compressed air. During the first 10 operating years alone, Biblis A registered 112 incidents—at any rate, that is how many were reported.

ATOMWIRTSCHAFT, the bulletin of the industry, joyfully welcomed, after so many negative reports, the report prepared by a commission of experts from the IAEA in Vienna which certified that the Biblis plant had "a very positive overall result."

But, at the time the IAEA experts inspected the "operation" in Biblis A in the autumn of 1986, the plant was idle the entire time. The Hessian Economic Ministry, at that time headed by nuclear power advocate Ulrich

Steger (SPD [Social Democratic Party of Germany]), therefore spoke of a "mickey-mouse commission."

But no opposing expert opinions were prepared. A group of international experts, consisting half of critics and half of advocates of nuclear power, who were to prepare a safety prognosis for the reactor by direction of what at that time was the Red-Green state government, was quickly dissolved after the change of administrations in Wiesbaden; the former Federal Atomic Minister Walter Wallmann (CDU) had taken over the government in 1987.

The Red-Green commission would have found lots of critical material. Even the joyful report from Vienna, prepared on request of the Federal Government, contained massive, albeit hidden criticism.

The Vienna visitors had clearly recorded the following concerning lack of communication between the individual shifts which was now considered another cause of the fact that the second and third shifts did not find out anything about the defect reports on the control desk:

"Some improvements are becoming necessary in the repeat training program for control panel and shift personnel. Reports containing subject matter that is critical in terms of time, such as system changes and operational events, are not read in a routine fashion by control panel personnel. Recordings on operating events (trouble) for blocks A and B were not circulated in a routine fashion for the information of the shift team."

This criticism was disregarded and the atomic community only registered the good marks.

In order not to have to admit that all of them together were not at all interested in such warnings and in clarifying the situation in Biblis, the responsible ministers and managers of the RWE during last week staged a grotesque play of reciprocal blame-fixing.

No sooner had Hesse's Atomic Minister Weimar taken the heat off himself by asserting that the operators had informed his supervisors in a "recognizably false fashion," than his Bonn colleague Toepfer grabbed at this straw in order to divert attention from the mess in his own ministry.

Hastily he ordered the publication of a letter to Wiesbaden in which he asked whether, in view of the false information, the reliability of the operators of the Biblis pile was still guaranteed in view of all of this false information. He therefore reserved for himself the right "to take subsequent steps in terms of federal supervisory action."

Frightened by the prospect of rubbing his atomic clients the wrong way, Weimar thereupon promptly denied his initial accusations against the atomic managers of the Essen electric power corporation. His comments had been taken "out of context," he excused his action in addressing the mighty of the atomic industry: "at no

time" had he intended to doubt their reliability and expert knowledge.

To restore peace within the community, RWE Boss Guenther Klaette on Thursday of last week offered a formula for reconciliation to his squabbling helpers by inventing evil powers and conspiracies. "All of us did not really assess it in this way," said Klaette, but "all" did know about it. The blame for this entire mess is probably to be fixed only upon the foreign atomic competition that launched the report in a much-read American technical publication.

In the future, there was no longer to be any such confusion, Toepfer promised in the end. Every quarter he wants to submit a report on incidents in the West German reactors and he wants to communicate all reported category "U" events immediately to the Environmental Committee of the Bundestag and of the press.

That does not constitute grounds for relaxation because the real causes of the dangerous incident in Biblis are hardly eliminated as a result of that. This is because the simple explanation, with which all those involved dismissed the problem, to the effect that this was nothing more than a onetime "case of human failure," is "a bit of nonsense" according to atomic scientist Klaus Traube (see Page 92 [not reproduced]).

Emphatically, he and other atomic critics therefore pointed out that the conspiracy of the "safety culture," as conjured up by the apologists of nuclear technology following the Chernobyl disaster, cannot do away with the basic fact that the operating crews are overburdened by the highly complex systems: The false sense of security, which arose during the years of routine operation, sooner or later causes precautionary rules and testing procedures to appear bothersome and superfluous.

Valeriy Legasov, the leading Soviet reactor safety expert, is seriously bothered by the fact that it is precisely this unavoidable attitude of personnel in atomic power plants that makes all safety philosophies basically untenable.

In his memoirs he wrote: "A generation of engineers has grown up who mastered their work in an expert fashion but who behaved in an uncritical manner in dealing with the equipment and the safety systems."

This is why, as Legasov admitted following the Chernobyl disaster, "I kept having this gnawing doubt because, from my viewpoint as an expert, it seemed to me that something new has to be done, that you have to step aside and that you have to do things differently."

He was probably unable to cope with the fact that he did not manage to accomplish that in time. In April of this year, PRAVDA reported rather stonily that he had "departed from this life." He had hanged himself.

FINLAND

Nuclear Safety Administration Criticizes Plants
51002410 Helsinki HELSINGIN SANOMAT in Finnish
1 Dec 88 p 17

[Article: "Radiation Safety Center Reviews Defects at Loviisa Power Plant"]

[Text] The Radiation Safety Center has delivered to the Ministry of Trade and Industry a report critical of the license applications submitted by the Loviisa and Olkiluoto nuclear power plants. The report is especially tough on Loviisa, but despite everything the Center ends up recommending renewal of the power plant's license.

The State Council will rule on the license at the end of the year. The licenses of Imatran Voima's Loviisa II and Teollisuuden Voima's two units expire at the turn of the year.

Even after the State Council's decision, the Radiation Safety Center maintains a firm grip on the country's nuclear power plants, because according to the new nuclear energy law it can demand explanations, if necessary, and shut down the plants if defects turn up.

According to the Center, Imatran Voima's safety code is not up to date. The code is now being thoroughly revised and should be ready next year, according to Imatran Voima's timetable. The document contains information about the plant's basic design, a precise description of the plant, accident analyses, and an account of how the plant affects the environment.

Teollisuuden Voima's safety code is direct and precise, according to the Radiation Safety Center. Asea-Atom built Olkiluoto on the turnkey principle and at the same time furnished plenty of information about the plant. On the other hand, the Loviisa nuclear power plant was assembled from parts which were gathered from around the world. Items that can be checked from documents at Olkiluoto have to be gone through slowly at Loviisa. Imatran Voima itself has also had to do a lot of explaining to authorities.

The performance of both plants is among the world's best.

Big Shield Wall Constructed

A big fire wall that extends through the turbine room is being constructed at the Loviisa nuclear power plant. The purpose of the safety wall, which will be ready at the end of the year, is to protect safety devices, among other things, from fire.

The feedwater systems are important for safe operation of the nuclear power plant. At the Loviisa plants, a wall protects feedwater devices which are needed to remove from the reactor loop the heat derived from uranium fuel. If the heat is not eliminated, the reactor overheats the same way it did at Harrisburg, for example.

Heat comes out of the reactor even when it is shut down. Elimination of residual heat in case of a big fire has authorities worried.

The Radiation Safety Center has commissioned the State Technical Research Center to analyze the risks of eliminating residual heat, and Imatran Voima is required to make a report on this matter.

Both Loviisa I and II are also equipped with an emergency feedwater system which is entirely independent of the turbine-room fire. The system is scheduled to come into use next year. The plant also has a sprinkler system to counteract fires.

The auxiliary system is based on the idea that the automatic fire-extinguishing system may not work.

Troublesome Pressure Vessel

In addition to residual-heat removal, authorities are still interested in the durability of Loviisa II's reactor pressure vessel.

The pressure vessel is made of forged rings which are welded together. One of the joints is at the heart of the reactor. According to the Radiation Safety Center, test results show that the embrittlement caused by neutron radiation has been faster than predicted, especially in the welded joints.

Safety of the plant is not endangered at normal operating temperatures, but if cold water is fed into the reactor pressure vessel during an accident or breakdown, the risk of breakage grows.

At this stage, the Radiation Safety Center does not take into account how long the plants have been in service.

Because of weaknesses, however, the lifespan of Loviisa I's pressure vessel may be about 30 years, unless the vessel is somehow mended. The lifespan of the Olkiluoto power plant, for example, is estimated at 40 years. The pressure vessel can be mended by heat treatment in which the vessel's metal is heated and slowly cooled.

To prevent embrittlement of Loviisa's pressure vessel, the outermost fuel bundles are replaced by steel units, the emergency cooling water is warmed, and there is a focus on safety all along the line.

Imatran Voima has also done a thorough risk analysis with the method developed by the U. S. Nuclear Regulatory Commission. The company is required to evaluate what will happen if, despite precautionary measures, the pressure vessel breaks.

The shield building at the Loviisa nuclear power plant is not as strong as the one at Olkiluoto, for example. The reactor pit, which is part of the shield building, can be damaged if the pressure vessel breaks. This matter is still being addressed.

The fate of spent fuel is an important issue for Teollisuuden Voima. The main practice is to provide for burial

of nuclear waste in Finland's bedrock, but the use of foreign disposal services is also being explored.

According to Teollisuuden Voima's announcement, the People's Republic of China might be willing, in principle, to accept Olkiluoto's spent fuel without any provision in the contractual arrangements for the subsequent return of wastes which arise during reprocessing. The return provision is included in contracts concluded with West European firms.

According to the Radiation Safety Center, only the export of spent fuel to China would fulfill the number one goal of Olkiluoto's power plant units, namely, that the waste be left entirely abroad.

Exporting the wastes to China involves some unsolved problems, one of which is that the country still does not have facilities intended for processing fuel. Teollisuuden Voima has also been in contact with the Soviet Union, but an agreement does not appear possible during the next few years, according to the company.

NETHERLANDS

Secret Service Reopens Nuclear Spy Case
AU1201075789 Paris AFP in English
0747 GMT 12 Jan 89

[Text] The Hague, Jan 12 (AFP)—The Dutch secret service (BVD) has re-opened its file on a Dutch engineer, a suspected Pakistani agent who has previously been accused of helping Islamabad make a nuclear bomb, the daily De Telegraaf reported Wednesday.

Henk Slobos, head of a firm of industrial troubleshooters, has received "vast sums" from Pakistan's Embassy in Bonn over the last few years, paid into his account at the West German Commerzbank, the paper said.

West German television is about to broadcast a report showing that payments of 500,000 guilders (250,000 dollars) and 250,000 guilders were paid into his account on December 19, 1985 and March 20, 1986, for services rendered to Pakistan, the paper said.

The television report also names Mr Slobos as the top agent controlled by Professor Abdul Quader Khan, director of nuclear research at Kahuta, near Islamabad, the paper said.

Professor Khan, who met Mr Slobos while studying in the Netherlands, was sentenced to four years' imprisonment in November 1983 for trying to steal secret Dutch plans on the procedure for enriching uranium by centrifuge.

He was deported when the sentence was quashed on a technicality on appeal, although he was found back in the country last December 24, rearrested and expelled. Mr Slobos was in his car when he was arrested, an interior ministry spokesman said.

Mr Slobos was jailed for a year in July 1985 for exporting strategically sensitive material to Pakistan.

The prosecutor alleged that Mr Slobos had knowingly and willingly co-operated in Pakistan's project to make a nuclear bomb.

The ministry spokesman said the BVD was keeping a watch on Mr Slobos's business dealings.

TURKEY

FRG Ship Carrying Radioactive Waste Returns
TA1101122489 Ankara Domestic Service in Turkish
1100 GMT 11 Jan 89

[Excerpt] Once again the Petersberg, an FRG ship carrying radioactive waste, has anchored 1 mile from Turkish territorial waters in the Black Sea. The ship was not granted permission to enter Turkish waters, but it has been agreed to supply it with provisions.

The Petersberg has anchored 13 miles from the Black Sea exit of the Istanbul Strait. A coastal guard is escorting the ship.

In a telephone conversation with our correspondent in Istanbul, Capt Gunther Grossjan, the skipper of the ship, said that he approached the Turkish waters because the Soviet Union did not supply provisions to the ship. He added that they will drop anchor off the Soviet waters after they receive their provisions. The skipper also said that they will not use the Danube because the water level falls there in winter months.

The skipper spoke to the FRG Consulate General and with the FRG firm's agency in Istanbul this morning. The agency said that it will no longer be the ship's agency because the firm has not paid its debts. As before, the FRG consul general can ensure that the ship gets its provisions, the agency said.

The Petersberg, which is a river-type ship of 1,392 gross tons, had previously arrived in Turkey last May. [passage omitted]

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